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A STUDY OF THE EFFECTIVENESS OF DATA PROCESSING SUMMER INSTITUTES FOR BUSINESS TEACHERS.

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DESCRIPTORS- *SUMMER INSTITUTES, *TEACHER EDUCATION, *DATA PROCESSING, *BUSINESS EDUCATION, *PROGRAM EFFECTIVENESS, TEACHER SHORTAGE, TEACHER PERSISTENCE, TEACHER ATTITUDES, PROGRAM DESCRIPTIONS, PROGRAM EVALUATION,

FIVE 8-WEEK SUMMER INSTITUTES IN BUSINESS DATA PROCESSING WERE CONDUCTED FROM 1963 TO 1965 TO ASSIST 353 PARTICIPANTS IN DEVELOPING THE KNOWLEDGE AND SKILLS ESSENTIAL FOR TEACHING SPECIALIZED COURSES IN A 2-YEAR VOCATIONAL PREPARATORY CURRICULUM IN BUSINESS DATA PROCESSING. THIS STUDY AIMED TO DETERMINE (1) THE INSTITUTES' SUCCESS IN ALLEVIATING THE TEACHER SHORTAGE, (2) THE STRENGTHS AND WEAKNESSES OF THE INSTITUTES AS THE PARTICIPANTS PERCEIVED THEM, (3) THE EFFECTIVENESS OF THE INSTITUTES IN PREPARING TEACHERS, (4) FACTORS RELATED TO THE PARTICIPANT'S PERSISTENCE AS A DATA PROCESSING TEACHER, AND (5) THE SHORTAGE OR POTENTIAL SHORTAGE OF DATA PROCESSING TEACHERS. THE CURRICULUM PROVIDED FOR APPROXIMATELY 3 HOURS OF LECTURES AND AN EQUAL AMOUNT OF LABORATORY PRACTICE ON DATA PROCESSING MACHINES, COMPUTER PROGRAMING, AND PROGRAMING AND BUSINESS INFORMATION SYSTEMS. FINDINGS FROM 254 PARTICIPANT QUESTIONNAIRES INCLUDED--(1) APPROXIMATELY 70 PERCENT HAD TAUGHT ONE OR MORE SPECIALIZED COURSES SINCE ATTENDING AN INSTITUTE, AND (2) THE PRINCIPAL STRENGTHS OF THE INSTITUTES WERE THE FACILITIES, THE COURSE OFFERINGS, AND THE PARTICIPANTS' INTEREST IN AND ACQUISITION OF KNOWLEDGE AND MATERIALS USEFUL IN TEACHING, (3) THE PRINCIPAL WEAKNESS WAS THE INADEQUATE TIME IN RELATION TO THE AMOUNT OF MATERIAL PRESENTED AND PRACTICE ON THE COMPUTERS DURING LABORATORY PERIODS, AND (4) FACTORS SUCH AS AGE, PRIOR WORK EXPERIENCE, EDUCATIONAL EXPERIENCE, SEX, DEGREES, AND SUBSISTENCE RECEIVED WERE FOUND NOT TO BE SIGNIFICANTLY RELATED TO WHETHER OR NOT THE PARTICIPANTS PERSISTED AS DATA PROCESSING TEACHERS. DATA FROM EDUCATIONAL INSTITUTIONS AND STATE DIRECTORS OF VOCATIONAL EDUCATION INDICATED THAT FROM 475 TO 525 TEACHERS WERE NEEDED FOR 1967, 600 FOR 1968, AND 750 FOR 1969 IN 2-YEAR PREPARATORY PROGRAMS. RECOMMENDATIONS CONCERNED DEVELOPING FURTHER INSTITUTES, REVISING THE ELECTRONIC DATA PROCESSING-I CURRICULUM GUIDE, AND STUDYING THE NEED FOR BUSINESS DATA PROCESSING PREPARATORY PROGRAMS. (PS)

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A STUDY OF THE EFFECTIVENESS OF SUMMER DATA PROCESSING INSTITUTES FOR BUSINESS TEACHERS

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1 A STUDY OF THE EFFECTIVENESS OF DATA PROCESSING SUMMER INSTITUTES FOR BUSINESS TEACHERS

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SECTION I

INTRODUCTION

Five Summer Institutes in Business Data Processing for Teachers were conducted during a three-year period beginning in 1963. The primary purpose of the institutes was to assist teachers in developing the knowledge and skill essential for teaching specialized courses in a two-year preparatory curriculum in business data processing. A first-year program was conducted in 1963, 1964, and 1965. A second-year program was conducted in the latter two years.

Prior to the first summer, the U. S. Office of Education estimated that 200 teachers in business data processing were needed. As compared to today, the data processing industry and the usage of automated data processing equipment in business, industry, and government at that time was in its infancy. Trained in first-year programs were 347 teachers and administrators; returning for an advanced program were 103.

The plan for this study is based largely upon a proposal which was developed at Colorado State University. Significant credit is due to Dr. Douglas Sjogren, Director, Research Coordination Unit, and Professor of Vocational Education, Colorado State University, who made a substantial contribution to the design of the plan. Dr. Sjogren has served generously as a consultant and advisor. A number of ideas and suggestions for the study were received from other groups. State directors for vocational education, representatives of automated data processing equipment manufacturers, and institute staff members were anxious to have the study done. The gratitude of the evaluator is expressed to each of the above for encouragement and suggestions. Assisting in the initiatory stages of the proposal development was Dr. C. Dean Miller, Professor, Psychology Department, Colorado State University.

An attempt was made at the start of the institute project to develop a type of evaluation project to operate concurrently with the institutes. For various reasons the evaluation project did not develop, and since that time there has been little attempt at formal evaluation.

Evaluation of a project such as the institutes presented some difficult problems and decisions. In a sense, the evaluation might be regarded as a typical curriculum evaluation project. On a common sense basis it would seem that one might evaluate curricula on the basis of comparing behaviors of students from different curricula. This is difficult, however, in that the different curricula are just that and consequently they likely have different objectives. One might evaluate different curricula on the basis of which curricula will be likely to achieve certain objectives most effectively. This form of evaluation would be desirable had there been contrasting curricula. Curricula for training data processing teachers are limited in number, and therefore a comparative study did not seem reasonable or justifiable.

Another possible approach was considered in which the curriculum would be evaluated on the basis of whether it attained the stated objectives. In this approach, measures would have been made of the knowledge and skills that were taught in an institute and these measures would have been administered to the participants. This approach was rejected as a basis for the evaluation because of the length of time intervening between the institute experience and the measurement. Each of the participants would have been out of the institute experience for at least a year before they were measured and consequently one would not be able to infer with any reasonable degree of confidence that any behavior shown by the participant was related to the institute experience.

For the reasons stated above, it was decided that evaluation based on comparisons of curricula or on whether prior participants exhibit behavior consistent with the objectives of the institutes' curricula would not yield data of sufficient worth to justify the costs of gathering the data. This decision rules out the possibility of using models or paradigims which have been developed because those have been designed primarily for an 'inprocess' curriculum. They are not generally suited for an evaluation of a project such as the institutes which have ended. The evaluation model developed by Professor Robert Stake, University of Illinois (1966), has been selected for use as a guide in the organization and the reporting of the data, even though it could not be used in toto. Following the objectives which are given below is a brief description of this model.

A basic assumption for this study then is that those institute participants who complete either a one- or two-year program have learned the knowledge and skills that were taught in the institutes. Further, it is assumed that such knowledge and skills are those needed for teaching specialized courses in a two-year preparatory curriculum in business electronic data processing under the federally supported Vocational and Technical Education Act.

These assumptions seem warranted. The institute instructors likely used evaluation devices that enabled them to assess the performances of their students. If the student received a certificate in the course, he then would seemingly have achieved a satisfactory level. Also, the curriculum guide from which the institute curricula was formed had been developed on the basis of an investigation into the training needs of persons in data processing.

OBJECTIVES

The objectives of this study are as follows:

1. To attempt to determine whether the institute project has helped to alleviate the teacher shortage in the areas for which the institutes were designed.

2. To obtain an indication of the strengths and weaknesses of the institutes as the participants perceive them.

3. To determine the effectiveness of the institutes in preparing teachers to teach the specialized courses in data processing.

4. To attempt to determine whether there are factors which relate to whether or not the participant persists as a data processing teacher. Factors to be studied specifically are: age, work experience, educational experience, grades, and the receiving or not receiving subsistence while attending the institute.

5. To attempt to determine whether there is a shortage or potential shortage of data processing teachers.

DESCRIPTION OF EVALUATION MODEL

An allusion was made on page 2 to an evaluation model which had been selected for use as a guide in organizing and reporting the data gathered in this study. To describe fully the model is beyond the scope and purposes of this study, however, a brief description seems warranted.

That evaluation of an educational program should be both descriptive and judgmental is strongly endorsed by Professor Stake. To accomplish these objectives, a three part model was conceived. The first part is known as the RATIONALE and is a description of the settings, the philosophic background and basic purposes of the program.

The second part is the DESCRIPTION MATRIX and includes intended and observed antecedents (conditions existing prior to teaching and learning which may relate to outcomes), transactions (successive engagements which comprise the process of education), and outcomes (consequences of educating--immediate and long-range, cognitive and conative, personal and community-wide).

The third part of the model is the JUDGMENT MATRIX and includes standards and judgments regarding antecedents, transactions, and outcomes. As applied to educational programs, objective standards which have been thoroughly and explicitly defined and which have been accepted locally and nationally as just criteria by which the merit of a program may be judged, are not readily available. Studies of comparable programs, and the use of evaluation checklists are a help but should be viewed as means rather than as ends. Judgments, as used in the model, includes a processing of judgments rendered by pertinent reference groups as well as those rendered by the evaluator.

The evaluator, in processing descriptive data, determines if a logical contingency exists among intended antecedents, transactions, and outcomes; determines if there is congruence between intended and observed components of the matrix; and finally measures the empirical contingency among the observed antecedents, transactions, and outcomes. In processing the judgment of the merit of a program, the evaluator makes comparisons between the descriptive data obtained earlier with standards of excellence and also comparisons with descriptive data from another program.

ORGANIZATION OF THE REPORT

Following these introductory remarks are three major sections. The second is concerned with an evaluation of the institute project and is specifically related to the first four objectives listed above. The third section is addressed to the fifth objective; the fourth contains summaries and recommendations.

SECTION II

EVALUATION OF THE INSTITUTE PROJECT

RATIONALE

A rapid expansion in the use of electromechanical and electronic equipment to process business data has been taking place in the United States. This expansion has been made possible by recent technological improvements in punched card and computer equipment and a growing acceptance of this equipment as a means of processing data. The increased usage of the equipment is due to a number of factors; namely: 1) the growth and diversity of modern business organizations; 2) external influences and requirements imposed upon the firm; 3) the development and refinement of techniques of management science and the resultant internal requirements imposed by top management; and 4) growth of the population and the economy.

The impact of this expansion may be revealed by observing the increasing ratio of clerical workers to others; automated data processing equipment sales; the number of computer installations; the number of computer applications; and the United States Department of Labor surveys showing needs for a whole new spectrum of occupational types of employees to work in computer-centered firms.

Prior to 1963 the training of automated data processing workers was largely a function of the manufacturers of such equipment. Prior to 1962 school administrators and teachers, state directors for vocational education, business firms, and automated data processing equipment manufacturers began raising the question of what the nation's schools could and should be doing with respect to offering technical training to students in this new field. In the winter of 1962, the critical need for teachers who could teach in this new technical field became obvious when seven regional conferences were conducted by the Division of Vocational and Technical Education, U. S. Office of Education. At these conferences, the division learned that some school systems were willing and desirous of initiating preparatory training programs for the training of computer programmers and application analysts. These school systems had to abandon such thoughts because of two major problems: 1) financing equipment acquisitions; and 2) obtaining qualified teachers. The latter problem was especially serious because teacher training institutions had not yet moved in the direction of teacher preparation in data processing.

In an attempt to meet head-on this apparent teacher shortage, the Technical Education branch surveyed the state directors of vocational education to determine the number of data processing teachers thought to be needed. From this survey, it was learned that approximately 200 teachers should be trained. Consultations began between members of the Technical Education staff and data processing equipment manufacturer's representatives, state directors for vocational education, and school administrators. Among the results of these meetings, substantial support was found for the development of a project to train approximately 200 business teachers.

INTENTS

OBJECTIVES AND PURPOSES OF THE INSTITUTES

The purpose of the institute project was to assist in developing the knowledge and skill essential for teaching specialized courses in a two-year preparatory curriculum in business electronic data processing under the federally supported Vocational and Technical Education Act. The specialized courses are discussed in detail in a later section of this report. It should be pointed out here that they are courses having a higher content of technical knowledges and skills than other courses in the curriculum.

Because of the careful planning which took place in the development and organization of the institute project, each institute subscribed to and adopted the above purpose.

Other objectives, more specific in nature, have been identified and are as follows: 1) to alleviate the teacher shortage in business data processing; 2) to assist teachers in developing a two-year curriculum in data processing for their back-home situation; and 3) to teach teachers how to teach data processing specialized courses.

DEVELOPMENT OF THE INSTITUTE PROJECT

An advisory committee meeting was called to Washington, D. C. in January, 1963. The task of the advisory committee was to organize and plan the project. Decisions of this committee resulted in 1) the establishment of five summer institutes, 2) the development of criteria to be used in the selection of the participants, 3) the development of the curricula to be followed in an institute, and 4) the development of guide lines to be followed in the organization and conduct of an institute.

Five institutes were conducted in 1963, 1964, and 1965, offering a first-year program. A second-year program was offered in 1964 and 1965.

1. The Establishment of the Summer Institute Project

Criteria used by the advisory committee to select institutions in which an institute would be conducted were: 1) geographic location; 2) availability of facilities and staff; 3) quality of staff and facilities; and 4) experience in the field of electronic data processing and the preparation of programmers and application analysts. The Institutions selected by the advisory committee and the states served by each is given:

Orange Coast College Costa Mesa, California	Alaska, Arizona, California, Hawaii, Idaho, Guam, Nevada, Oregon, Washington
Colorado State University Fort Collins, Colorado	Colorado, Kansas, Montana, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, Utah, Wyoming
Miami-Dade Junior College Miami, Florida	Alabama, Arkansas, Georgia, Louisiana, Mississippi, Florida
Central Industrial Education Center Charlotte, North Carolina*	Connecticut, Delaware, District of Columbia, Kentucky, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Puerto Rico, Virgin Islands, Virginia, West Virginia
Milwaukee Institute of Technology Milwaukee, Wisconsin	Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, North Dakota, Ohio, Wisconsin

*In 1964 the first-year program of the North Carolina institute was held at Asheville Industrial Education Center, Asheville, and the second-year program was held at Burlington Industrial Education Center, Burlington, North Carolina. In 1965 both program levels were held at the Holding Technical Institute, Raleigh, North Carolina.

Throughout the remainder of this report, the various institute locations will be referred to by the name of the state in which it was located; i.e., the California institute.

2. Selection Criteria of Participants.

The advisory committee utilized suggestions stemming from consultations alluded to earlier. Two primary qualifications evolving from these discussions were identified as: 1) each participant should have experience as a business education teacher, and 2) each participant should have experience as a worker in a business, particularly in an office occupation. The criteria in their final form, as developed by the advisory committee for the 1963 institute project, were as follows:

1) Each participant must possess a B.S. degree or equivalent in business education, preferably with one year of accounting.

2) Each participant must have at least three years of teaching or work experience in business, preferably in accounting, business mathematics, business law, or office procedures.

3) Each participant must be employed as a business teacher, a business department chairman, or have an equivalent position requiring a

current knowledge of business.

4) Each participant must be available for a teaching assignment in a Title VIII program.

5) Each participant must be capable of qualifying, upon completion of the institute, as a teacher of business data processing in a Title VIII program under the state plan for Vocational Education.

Some changes were made in the selection criteria used in 1964 and 1965. The eligibility requirements for 1965 are presented below for comparative purposes.

1. Bachelor degree in business, mathematics, or equivalent; preferably with approximately one year of study in accounting.

2. At least three years of teaching experience or combination of teaching and work experience in the field of business or data processing; preferably in accounting, administration, mathematics, or business law.

3. Currently employed as a teacher or department chairman with teaching responsibilities in the field of business or data processing.

4. Available for a teaching assignment and capable of qualifying, at the completion of the institute, under the State plan as a teacher of business data processing in a curriculum designed to prepare computer programmers and application analysts.

5. Recommended for enrollment by State Director of Vocational Education in sending State.

The changes in the selection criteria were an outcome of evaluation and planning conferences held following each summer. These conferences are described further in a later section of this report.

3. The Institute Curriculum.

A third decision made by the advisory committee was to develop and adopt a curriculum which would be used in the institute project. A publication of the Office of Education, Electronic Data Processing--A Suggested 2-Year Post High School Curriculum for Computer Programmers and Business Application Analysts, had just been published. The committee selected four courses from this guide for the 1963 institute project curriculum. They were:

1) Introduction to Business Data Processing

2) Electric Accounting Machines

3) Data Processing Applications

4) Computer Programming I

The committee felt that if a participant could develop an understanding of the content of these courses, then he would be able to carry his students through one academic school year. This one academic school year would refer to and serve as the first year of a two-year preparatory program. Advisory committee members were more concerned that the participants receive instruction in the topics covered by the four courses than they were that participants meet in four separate and distinct courses.

A further outcome of the evaluation and planning conferences held following the 1963 institute was a recommendation for a second-year program as well as a continuation of a first-year program at each location.

The courses in the second-year program were also taken from the Electronic Data Processing curriculum guide. Five courses were suggested. They were:

1) Computer Programming II

2) Programming Systems

3) Business Systems Design and Development

4) Advanced Programming Systems

5) Data Processing Field Project

Institute directors, instructors, and others attending the planning and evaluation conference were hopeful that successful participants would gain necessary skills and knowledges to teach the second-year program in their own back-home school systems. Thus participants who attended two summer institutes (a first- and a second-year program) would be qualified to teach the specialized courses in a two-year vocational data processing program.

4. Operational Guide Lines

The last major task confronting the advisory committee was the development of operating guide lines. Significant aspects of these are enumerated below:

1) An application form was constructed (Appendix A). The printed forms were to be completed in triplicate by a participant, sent to his state director of Vocational Education, and upon approval, was then sent to the institute director for his approval. Thus acceptance or rejection of participants became the responsibility of state directors and institute directors. Notification of the availability of training became a responsibility of the state director; whereas, notification of acceptance or rejection was a joint responsibility.

2) The length of the institute was established at eight weeks. The committee felt that the participants should receive "hands-on" experience with the equipment and suggested that a 3- to 4-hour period of actual machine lab time should be provided.

3) Seminars were to be held each week with invited guest lecturers.

4) Field trips to computer installations were to be made by institute participants.

5) A planning conference was to be called in April or May, 1963, for the purpose of bringing together instructors and institute directors who would be responsible for the conduct of the institute.

6) Communication lines were established between the Office of Education, Institute Directors, and state directors for Vocational Education for the proper channeling of problems.

7) Text books, supplementary materials, and supplies were discussed and recommendations were made.

8) Announcement of the availability of training in the institute project was primarily a responsibility of the state directors for vocational education. Once authority for funding had been given by the Office of Education, the state directors distributed the brochures. These brochures described the institute project and the initiatory procedures to be followed by an individual who wished to attend.

5. Publicity for 1964-65 Institutes

Following the 1963 institutes at least three articles appeared in nationally read educational periodicals, Among those who applied for the 1964 and 1965 institutes were a number who had read the articles or who had heard about the institutes by word of mouth. Institute directors received a considerable number of inquiries from interested teachers wishing to avail themselves of training. The state directors for vocational education distributed brochures announcing the project for '64 and '65 as they had done in 1963.

OBSERVATIONS

INSTITUTE FACILITIES

The advisory committee, referred to in the previous section, was guided to an extent in the selection of the institutions on the basis of available data processing equipment and facilities.

The institutions were two-year, post-secondary school systems with the exception of Colorado State University. Classroom facilities were similar and typical of those found in most school systems. Of special interest is the automated data processing equipment configuration. Considerable similarity was found among the institutions and particularly with respect to electromechanical or unit record equipment. The equipment typically available for institute participants is shown in Table 1. Variation from institute to institute was evident in the number of pieces of equipment and in models of the same equipment.

TABLE 1

ELECTROMECHANICAL (PUNCH CARD) EQUIPMENT
AVAILABLE FOR PARTICIPANT USAGE

Card Punches
Verifier
Sorter
Interpreter
Reproducer
Collator
Tabulator

A good amount of similarity was also found among the institutes in computer equipment. The equipment typically available for participants is shown in Table 2.

TABLE 2

COMPUTER EQUIPMENT AVAILABLE FOR PARTICIPANT USAGE

Central Processor
Card Reader
Card Punch
Printer
Tape Drive
Disk Pacs

Most all participants received training on the IBM 1620 and 1401 computer systems. A majority received training in programming for magnetic tape and disc units.

INSTITUTE STAFF

The staff of an institute was comprised of an institute director, instructors, and laboratory assistants. The directors were able to conduct the 1963 institutes with the equivalent of two full-time instructors and one laboratory assistant. In 1964 when both a first- and a second-year program were offered, the staff was increased. This increase was necessary because of the additional program being offered but also because of the nature of the courses making up the second-year program.

From experiences gained in the 1963 institutes, revisions were made which permitted some of the instructors to teach courses at both program levels. Thus an instructor teaching Computer Programming I in the first-year program may have also taught Advanced Computer Programming in the second-year program. Most of the directors added a part-time instructor for the Business Systems course. In Colorado in 1964 a part-time instructor was added to teach a course in Philosophy of Vocational Education. In 1965, a part-time instructor was added in North Carolina to teach Principles of Vocational Education. The equivalent of three full-time instructors was used in 1964 and 1965.

The number of laboratory assistants is not available. Some institutes employed these assistants on an hourly basis, some were contracted for the entire summer, and in some cases an instructor served as a lab instructor as well as a lecturer.

Background data on staff members were gathered by the use of a questionnaire. Staff members were interviewed during a visitation by the principal investigator at institute locations. Those staff members who could not be visited personally were mailed a copy of the interview guide. Responses from 16 instructors and five directors were received and tabulated.

Degrees

Twelve or 75 percent of the instructors had earned the master's degree. Two had the bachelor's degree, and two had earned the doctorate degree.

Work experience in data processing

Twelve instructors had worked in business, industry, or governmental data processing installations. Of these, nine had worked with unit record equipment; seven with computer equipment. The average work experience on unit record equipment was 27.5 months with a range from 0 to 178. The average work experience on computer equipment was 25.2 months with a range from 0 to 178.

An examination of individual teacher's work experience when associated with a specific institute reveals that in each institute location the participants were able to benefit from one or more instructors who had worked as a data processor.

Teaching experience in data processing

All of the instructors had teaching experience, and all of those except the part-time instructors who were teaching a Principles of Vocational Education course had taught data processing courses. The mean number of months' experience in teaching unit record related courses was 29.31 with a range from 0 to 144. The average number of months' experience in teaching computer equipment related courses was 29.94, with a range from 0 to 120.

Educational preparation to teach data processing

Twelve of the instructors had taken courses in data processing. The average number of months spent in formal course work was 4.38 in unit record equipment related courses and 5.25 in computer courses. The number of courses taken ranged from 1 to 15. Most of the course work available prior to 1963 was offered by data processing equipment manufacturers. Courses offered by these firms will vary typically from three days to three months.

Formal course work which had been taken in manufacturer's classes is difficult to equate to formal course work taken in colleges or universities. Four or five months of manufacturer's classes appears to be a rather substantial amount of preparation.

Some adjustments to the institute format was necessary for most of the instructors. Most had never conducted classes where the students were seasoned teachers. Other than the instructors at Colorado State University, the teaching experience of the instructors had been largely in the post-secondary two-year colleges.

In view of findings presented elsewhere in this report, the institute directors were fortunate to be able to assemble a staff of experienced teachers. The Florida director was fortunate in keeping his staff in tact during the three-year period. Colorado, California, and Wisconsin institutes were similar in that a part of the staff was retained while utilizing different members during a part of the period. Instructors in the North Carolina institutes taught only one summer each, as the institute location was moved each year. Seven instructors utilized in the 1965 institutes had been a participant in a previous year.

PARTICIPANTS

Prior to attendance at an institute, each participant submitted an application form which was approved by his home-state director for vocational education and an institute director. The principal investigator visited institute locations in each region except North Carolina for the purpose of obtaining as many application forms as were available. The visitation took place in October, 1966. Mr. Sam Geek, formerly with the state board of education in North Carolina, was asked to serve as a laison individual for that region. In that capacity, he gathered as many of the participant application forms from the three North Carolina sites as was possible. Application forms for each participant were not available--some had been misplaced, some mutilated, some lost.

From the application forms, data was gathered with respect to age, year attended, prior education, teaching and work experience, and degrees. Additionally from these forms, a mailing list was constructed which was used in mailing questionnaires. Table 3 shows the attendance at the five institute locations by year, and program level.

TABLE 3

PARTICIPANT ATTENDANCE BY INSTITUTE, YEAR, AND PROGRAM

	First-Year Program					Second-Year Program			
Institute	1963	1964	1965	Total	% of Total	1964	1965	Total	% of Total
California	15	27	24	66	19.08	9	9	18	17.47
Colorado	37	26	25	88	25.37	17	19	36	34.95
Florida	23	14	11	48	13.83	7	6	13	12.61
North Carolina	20	19	30	69	17.00	12	5	17	16.51
Wisconsin	28	21	27	76	21.90	7	12	19	18.44
Totals	123	107	117	347	100.00	52	51	103	100.00

Criteria used in selecting participants for the second-year program was not specifically spelled out except for a statement in the 1964 and 1965 brochures which appears as follows: "The second year program is planned primarily for participants who have completed the first year program." The brochures were used as a media of announcing the availability of training in the summer institutes. Of the 103 participants who attended a second-year program, 97 had completed the first year. The remainder had been advanced into the second-year level program because, in the judgment of the institute directors, the participants' background and experiences warranted such a decision.

Teaching experience and work experience remained unchanged as basic selection criteria for each of the three summers. Ninety-eight per cent of the participants had an average of 8.6 years of teaching experience. The range of teaching experience was 0 to 23 years. Approximately 83 per cent of the participants had worked in business, industry, or government with an overall range of 0 to 15 years.

The remainder of this discussion on antecedent conditions is based upon the data gathered from the questionnaire. Each participant, for whom an application form was available, was mailed a questionnaire. Table 4 shows the mailing and the returns.

TABLE 4

MAILINGS AND RETURNS OF PARTICIPANT QUESTIONNAIRE

		Questionnaires			
Institute	Attendance	Mailed	Deliverable	Returns	% of Return
California	69	69	59	49	83.1
Colorado	91	89	87	86	98.9
Florida	48	36	32	30	93.8
North Carolina	69	55	51	45	88.2
Wisconsin	76	61	50	44	88.0
Totals	353	310	279	254	91.0

The difference between the total attendance as shown in Table 3 and Table 4 can be explained by the fact that six participants attended only the second-year level of program. The percent of returns is based upon those delivered. Of those mailed, the return was 81.93 per cent; of those thought to be deliverable, the return was 91 per cent. The mobility of data processing teachers is perhaps not as great as for teachers in general. Three of the questionnaires were unusable.

The institute project was designed to be national in scope and to serve the needs of the states. Those states which were moving early into the development of two-year data processing programs seem to have been the ones to capitalize most upon the teacher training available. Thirty-five states, Puerto Rico, and the Virgin Islands were represented by participants. Table 5 shows a geographical distribution of the participants by originating states for which an application blank was available.

TABLE 5

GEOGRAPHICAL DISTRIBUTION OF PARTICIPANTS

Alaska
Arizona
California (60)
Colorado (22)
Florida (29)
Georgia (3)
Illinois (11)
Indiana (4)
Iowa (9)
Kansas (2)
Maryland (6)
Massachusetts (3)
Michigan (5)
Minnesota (6)
Mississippi
Missouri
Nebraska
Nevada (8)
New Hampshire
New Jersey (2)
New Mexico
New York (2)
North Carolina (12)
North Dakota (2)
Ohio (2)
Oklahoma (2)
Oregon (2)
Pennsylvania (22)
South Carolina
South Dakota (2)
Texas (46)
Virginia (5)
Washington, D. C. (2)
Wisconsin (24)
Wyoming (9)

Personal Characteristics

In this section, 251 participants are described in terms of biographical data which was taken from the questionnaire.

1. Sex: Number of males--191 (76%)
   Number of females--60 (24%)

2. Age: Mean age--38.02 years
   Range--22 to 61
   Standard deviation (s)--8.12

3. Subsistance Received in 1963 and 1964: yes--188
   no--99
   no response--36

   Fifty-two of this total attended the second-year program and therefore are included in both years. The source of the subsistance came from local school systems and from state departments of education. Built into the 1965 institute budgets was a provision for paying each participant a travel allowance and a stipend.

4. Degrees held: None--6 (2.3%)
Bachelors--91 (36.3%)
Masters--147 (58.6%)
Doctorate--7 (2.8%)

5. Prior work experience: None--53 (21.1%)
In business--193 (76.9%)
In government or industry--5 (2%)

For those who had worked in business, the mean number of years was 6.1 with a range from 1 to 15 years.

6. Prior teaching experience: None--3 (1.2%)
High School--134 (53.4%)
College--114 (45.4%)

The most recent experience was used to distinguish between high school and college experience. Several teachers have taught at both levels. The mean number of years taught was 8.6 years; the range was from 0 to 23 years.

7. Prior teaching experience by position:

Business education teacher--203 (80.8%)
Mathematics teacher--19 (7.6%)
Other than business education or mathematics teacher--10 (3.9%)
Administrator--12 (4.8%)
Registrar--4 (1.7%)
Counselor--3 (1.2%)

8. Courses taught prior to institute:

Accounting, auditing, bookkeeping--193
Banking, insurance, investments--33
Business law--66
Business statistics--2
Office machines, office practice--10
Marketing, merchandising--30
Computer programming--39
Unit record--18

Presented below are descriptive data regarding participants to which the questionnaire could not be delivered and those who did not respond. The data were gathered from the application form mentioned previously.

1. **Institute Attended:**

California	20 (35.7%)
Colorado	3 (5.4%)
Florida	6 (10.7%)
North Carolina	10 (17.8%)
Wisconsin	17 (30.4%)
Total	56

2. **Sex:**

Male	46 (82.0%)
Female	10 (18.0%)

3. **Age:**

Mean age	34.2 Years
Range	22-61

4. **Degrees Held:**

None	4 (7.1%)
Bachelors	20 (35.7%)
Masters	31 (55.3%)
Doctorate	1 (1.9%)

5. **Prior Work Experience:**

None	15 (26.8%)
In business	40 (71.4%)
In government or industry	1 (1.8%)

For those who had worked in business, the mean number of years was 4.3 with a range from 1 to 14 years.

6. **Prior Teaching Experience:**

None	6 (10.7%)
High School	23 (41.1%)
College	27 (48.2%)

For those who had taught, the mean number of years was 6.9 with a range from 1 to 22 years.

TRANSACTIONS

PROCEEDINGS

Courses and Descriptions

Among the purposes of the evaluator's visit to each institute location, one was to obtain as many as possible of the following items: schedules of classes and labs, course descriptions and outlines, class tests or examinations, and grades earned by participants. These sources provided much of the information in this phase. Another source used to describe the transactions between teacher and student was the files at Colorado State University. Reports from the planning and evaluation conferences, interproject correspondence, and summaries of institute proceedings were made available from these files.

Table 6 shows the titles of those courses offered in the 1965 institutes, which are indicative of those offered in prior years of the project.

TABLE 6

COURSE OFFERING, FIRST-YEAR PROGRAM

Course	Offering by Institutes					
	Calif.	Colo.	Fla.	N. Car.	Wisc.	Total
Introduction to Business Data Processing	X	X	X	X	X	5
Electric Accounting Machines	X	X	X	X	X	5
Computer Programming I	X	X	X	X	X	5
Data Processing Applications			X		X	2
Philosophy of Vocational Education		X	X	X*		3

continued on next page

SECOND-YEAR PROGRAM

Course	Calif.	Colo.	Fla.	N. Car.	Wisc.	Total
Computer Programming II	X	X	X	X	X	5
Business Systems Design and Development	X	X	X	X	X	5
Mathematical and Statistical Programming				X		1
Programming Systems	X	X	X		X	4
Advanced Programming Systems		X	X	X	X	4
Data Processing Field Project					X	1

*In North Carolina this course title was "Principles of Industrial Education." It was offered to participants in second-year programs who had not had such a course.

From Figure 6 one could conclude that Florida, in the first-year program, and Wisconsin, in the second-year program, offered five courses to their participants. Modifications were made, however, in order to ensure that lab times were available. In Florida, for example, the vocational education course was offered in ten class sessions at night by a member of the Florida Board for Vocational Education. In Colorado, the Introduction to Business Data Processing was combined with the Electric Accounting Machines course.

Following is a brief course description together with an estimated time allotment for each.

First-Year Courses

Introduction to Business Data Processing

A study of development of computer systems from manual methods to stored programs. Designed to provide a foundation for detailed study of specific systems. Time allotted: 40 hours.

Electric Accounting Machines

A survey of electric accounting machines, illustrating the need for machines in accounting and record keeping and the concept, power, and flexibility of the unit record. The importance and scope of unit record equipment as an independent system will be developed throughout the course. Laboratory exercise will be executed involving planning and wiring a range of unit record equipment. Practical exercises offered will be typical of those performed in the existing electric accounting machine installations. Time allotted: 120 hours.

Computer Programming I

Consideration of the function and capabilities of a specific data processing machine and the tools and raw materials necessary for becoming a programmer. Participants will perform programming drills, exercises, and case studies which will serve to bridge the gap from the theoretical to the real world of data processing. Time allotted: 120 hours.

Data Processing Applications

Designed to acquaint the participant with business data processing applications; practical case studies illustrate the use of data processing equipment in various types and sizes of representative companies. Time allotted: 40 hours.

Philosophy of Vocational Education

A presentation of the development of vocational education, the types of programs, philosophy, trends and problems in the field, and a study of provisions for offering and financing such programs. Time allotted: 40 hours.

Second-Year Courses

Computer Programming II

A continuation of Computer Programming I. The principles presented in the first-year course will be employed repeatedly. Programming the tape data processing system will be taught as well as the fundamentals of random access programming. Time allotted: 80 hours.

Business Systems Design and Development

Designed to guide the student through the three stages in the evolution of a system: analysis of present information flow; needed information flow; and system specifications and equipment selections and implementation of the system. Time allotted: 60 hours.

Mathematical and Statistical Programming

An introduction to programming systems to familiarize the student with the purpose and function of the various types of systems.

Mathematical and statistical problems are used as laboratory exercises to give facility in using programming systems. Time allotted: 80 hours.

Programming Systems

This introduction to programming systems will familiarize the student with the purpose and function of the various types of systems. Time allotted: 80 hours.

Advanced Programming Systems

The objective of the course is to provide the student with sufficient knowledge of programming systems concepts so that he may easily master any specific system with a minimum of instruction. Furthermore, he will be qualified to analyze, evaluate, and make minor modifications in such systems. Individual phases of certain selected systems are treated in detail in order that the student may learn advanced programming and logic decision techniques as applied in sophisticated systems. The course is so designed that the student may gain an insight into the various functions of advanced programming systems and the manner in which they perform their tasks without learning the actual programming language of the various systems. Time allotted: 80 hours.

Data Processing Field Project

Individual assignments in a carefully selected local data processing installation will be obtained during the fourth semester. The evaluation of the student's performance during this period will be a cooperative effort engaged in by local installation management and the vocational education staff. The primary purpose of this session is to give the student an overview of practical data processing. Time allotted: 40 hours.

Scheduling

Because of the combining of courses and the variations of offerings between institutes, a typical class schedule representative of all institutes is difficult to construct. Such a construction is compounded by the differences between institutes with respect to the approach used in a specific course. An example of the manner in which the Electric Accounting Machines course was taught should suffice. In one institute a lecture was presented in a morning hour and a lab assignment was to be completed in an afternoon hour. In another, a lecture was presented and a problem was to be completed immediately. In still another, a lecture was given--the participants were divided so that one group went immediately to lab and the other group attended labs later in the day. As one group went to work with the equipment, the instructor then worked on an individual basis with the remaining group; upon return of the first group, he would then work individually with the participants of that group.

Arrangements such as those described above were, in some cases, designed by desire; and in others, by necessity. In those institutions where the hardware was being shared with other divisions of the school system, "hands-on" time for participants was fitted into free time slots of the computing center schedule.

It would seem that a description of the proceedings would be incomplete without a schedule. Since a separate schedule for each institute is unavailable, one which was followed in North Carolina is presented. It appears to be typical of most.

TABLE 7

CLASS AND LAB SCHEDULE
NORTH CAROLINA -- 1965

First Year

Time	Course
8:15-10:00	Introduction to Business Data Processing: Theory and Applications
10:15-12:00	Computer Programming I Lab
1:00- 1:45	Computer Programming I
1:45- 5:00	Electric Accounting Machines and Lab
5:00- 6:00*	Principles of Industrial Education*

*Met on Monday, Wednesday, and Thursdays. All other classes met daily.

Second Year

Time	Course
8:00- 9:45	Mathematical and Statistical Programming
9:45-10:45	Business Systems Design and Development
11:00-12:00	Computer Programming II Lecture
1:15- 2:30	Computer Programming II Lab
2:30- 5:00	Advanced Programming Systems and Lab

Educational Field Trips

One of the intents of the project was that participants should visit computer installations. During the three-year period, 66 visitations were made by the participants. Efforts in evaluation were made by institute staff personnel, and only those installations believed to be worthwhile were revisited in succeeding years. Those which failed to make a beneficial contribution were excluded. The mean number of field trips taken by institutes is 4.2 with a range of 3-7.

Variation of installations by kinds of firms is shown below.

TABLE 8

VISITS TO COMPUTER INSTALLATIONS

Type of Firm	Number of Trips
Financial Institutions	14
Manufacturing Companies	14
Data Processing Service Bureaus	13
Merchandising Companies	6
Educational Institutions	6
Insurance Companies	2
Transportation Companies	3
Others	8
Total	66

Invited Guest Speakers

The contribution of guest speakers was also recognized as a desirable input in the educational experience of the participants and was encouraged by the advisory committee. A total of 83 speakers were invited to the five institutes during the project period. The directors and instructors sought to improve in their selection of these speakers following each year. The mean number of speakers utilized per year in each institute was six. Those institutes located in metropolitan areas called upon a large source of speakers more frequently than did Colorado and North Carolina where distance was more of a problem.

Materials

Utilization of manufacturer's reference manuals as either texts or supplementary materials was extensive. This was particularly true in 1963 which was in advance of many of the publishing companies' efforts. These manuals were, in the opinion of the instructors, the best available at that time but were still thought to be something less than desirable.

Related reference books and periodicals were made available to participants at institute libraries. The adequacy of data processing volumes in those libraries during 1963 particularly, is questionable.

Efforts were made by institute staff members to disseminate materials in the form of pass-outs which they had found to be beneficial. Participants were also encouraged to duplicate copies of papers or special assignments for class members. Listed below is a listing of typical pass-outs which were distributed in most institutes.

Lecture and Course Outlines
Class exercises and problems for
  Unit Record and Computer Programming Courses
Masters for Overhead Transparencies
Laboratory Procedures
Bibliographies of Reference Material
Machine Schematics
Sample Tests in Data Processing

OUTCOMES

To those who would expect to find an elaborate display of participant achievement scores on some measure and an extensive statistical treatment of such data, the outcomes presented below will be disappointing. As indicated in the introduction (p. 1.2), a decision against this approach was made. The outcomes described below are categorized according to the first four objectives of the study (p. 1.4). It would seem that objective Nos. 1 and 3 are closely related and are, therefore, considered at one time.

Objective 1--To attempt to determine whether the institute project has helped to alleviate the teacher shortage in the areas for which the institutes were designed.

Objective 3--To determine the effectiveness of the institutes in preparing teachers to teach the specialized courses in data processing.

There appears to be a logical contingency among the intended antecedent conditions (selection of institutions and their facilities, quality and quantity of staff, participant backgrounds), the intended transactions (the courses, lectures, labs, field trips, and speakers), and the intended outcomes (to assist in the training of 200 teachers to teach specialized courses in data processing). A description of this data matrix has been given in the preceding section. Similarly, a description of the observed antecedents, transactions, and outcomes have been presented.

Evidence can be seen of the congruence between the intents and the observations. The reader's attention is directed to Table 3, page 2.11 which shows that 347 were assisted in developing necessary knowledge and skills essential to teaching data processing courses. The 347 teachers who were trained (observed outcome), contrasted to the 200 (intended outcome), is illustrative of the congruence existing. Additional evidence of the congruence is found in the description of the participant's personal characteristics beginning on page 2.13, particularly item Nos. 5, 6, and 7. Because of the nature of this evaluation of the institute project, it was not possible to measure with any degree of confidence the extent of the contingence or the congruence. In a formal evaluation of an inprocess educational program, a measure could be developed; however, the objectives of the evaluation would likely have been different.

Shown in Table 9 below are data based upon the questionnaire with respect to teaching experiences following attendance at an institute.

TABLE 9

COURSES TAUGHT BY 251 PARTICIPANTS
FOLLOWING AN INSTITUTE EXPERIENCE

	1963-64	1964-65	1965-66
Accounting, auditing, bookkeeping	53	78	88
Banking, insurance, investments	7	8	10
Business law	14	24	23
Business Statistics	4	8	13
Office machines, office practice	12	24	35
Marketing, merchandising	6	7	10
Computer Programming	32	77	103
Unit Record	38	108	141

Of the 251 participants, 193 taught an accounting-type course prior to an institute experience, and less than half that number had taught the course since attending an institute. An accounting-type course may be termed a stop-gap course in which a teacher often teaches one or more sections and then moves into other types as staff needs become a reality. It would seem that teachers of the two specialized courses in data processing had moved into the area from accounting. Other lateral movements are noted; however, the changes in the aforementioned courses were the greatest. That the participants began teaching the specialized courses following an institute experience is evidenced by the upward trend shown in Table 9. Computer programming courses were taught by 32 following the first summer and by 103 following the third summer. Similarly, 38 taught unit record courses in 1963-64, whereas 141 taught those courses in 1965-66.

Further analysis of the questionnaires reveals that 178 (70.9%) of the respondents have taught a unit record course or a computer course since attending an institute. Conversely, 73 (29.1%) have not taught either of these courses. Table 10 indicates further that 88 have never taught a unit record course; 133 have never taught a computer course.

TABLE 10

NUMBER OF PARTICIPANTS WHO HAVE NOT TAUGHT SPECIALIZED COURSES IN DATA PROCESSING

Institute	Returns	Courses and Percent of Returns					
		Unit Record	%	Computer Programming	%	Neither	%
California	49	15	30.7	27	55.1	11	22.5
Colorado	85	23	27.1	43	51.6	20	23.5
Florida	29	11	37.9	20	69.0	10	34.5
North Carolina	44	18	40.9	20	45.5	15	34.1
Wisconsin	44	21	47.7	23	52.3	17	38.6
Totals	251	88	35.0	133	53.0	73	29.1

One should not judge the effectiveness of an institute solely upon whether the participants trained therein have taught one of the specialized courses. Factors relating to persistance in teaching data processing courses are analyzed in a later part of this section.

It is clear from the above findings that the data processing teacher shortage was alleviated and the institute project was effective. The extent to which the teacher shortage was alleviated can be seen in the fact that 178 have taught in the area for which they were trained. The intent was to train 200, and in this respect 89% of the goal was reached. It is doubtful, however, if the goal of 200 remained static during the three-year period. Information relative to a change in this expected outcome could not be located.

When a judgment is made with respect to a phenomenon, a standard has been conceived. Normally, a student achieving a 90% rate would be considered a success. With respect to making judgments about the success or failure of a project such as the institutes, a considerable number of variables should be considered. A cost-benefit analysis, if it were possible, would likely add precision in making a judgment of the institutes.

Intuitively, it is doubtful if the project designers would have been pleased with only 71% of the participants using the training they received to teach specialized courses. Data to which the above findings might be compared are not available. In view of the rationale, objectives of the project, and the selection criteria, a 71% success could not receive an "A" rating.

OBJECTIVE 2--TO OBTAIN INDICATIONS OF THE STRENGTHS AND WEAKNESSES OF THE INSTITUTES AS THE PARTICIPANTS PERCEIVE THEM.

The data presented below was gathered by the questionnaire and was taken from Part III. The participants were asked to express an opinion on 34 items in terms of their agreement or disagreement. Two sets of the 34 items were included in the questionnaire. The participants were asked to respond to the second set if they had attended two of the institutes. The data collected from those attending two institutes was insufficient to make any inferences with confidence. Some of the participants, rather than fill out the second set, wrote the words "same as first" and did not complete this part. After comparing several responses from those who had completed both pages of Part III and noting that there were little differences in their assessment of the second-year program, as compared to the first; a decision was made to work with the data collected from the first set of items only.

Responses for the positively stated items were weighted as follows: Strongly agree--4; Agree--3; Undecided--2; Disagree--1; and Strongly Disagree--0. The negatively stated items were weighted in a reverse order. A mean was then computed for each item. Thus an item obtaining a mean of 3.11 would indicate an "agree" for a positively stated item or a "disagree" for a negatively stated one. The items were arrayed in eight categories by institute and by year. The means were then punched into IBM cards for processing. To analyze the differences in the responses, a computer program (Med Comp IMP009--Three-way Analysis of Variance, without replication) was used for processing purposes.

The analysis of each category which follows proceeds from a presentation of item means and a discussion of selected items, to a presentation of category means and a discussion of differences. In the event a difference is statistically significant and is due to interaction, a graphic presentation is made.

CATEGORY I--FACILITIES

1 The meeting rooms were of adequate size
2 The physical factors (color, light, accoustical) were satisfactory
3 Ventilation of the rooms was satisfactory
5 The amount of unit record equipment was adequate
6 The amount of computer equipment was adequate

TABLE 11

ITEM MEANS, CATAGORY I

Item No.	1963	1964	1965	Item Mean
1	3.32	3.44	3.38	3.38
2	3.16	3.66	3.36	3.39
3	2.94	3.04	2.62	2.87
5	3.10	3.22	3.26	3.19
6	2.88	3.00	2.66	2.85
Yearly Mean	3.08	3.27	3.06	3.14

Participant satisfaction is evident with respect to the facilities used in the institute. Considerable agreement is noted in Item 1 (adequacy of room size) and Item 2 (satisfaction with physical factors). The amount of unit record equipment (Item 5) was felt to be satisfactory. Ventilation of the meeting rooms (Item 3) was satisfactory but received the lowest degree of agreement of any of the items. The amount of computer equipment (Item 6), while satisfactory, received the lowest overall endorsement of the participants. Whether or not the *amount* was equated with its availability is not known. The question of adequacy of hand-on time with computer equipment is considered in another category. The 1964 participants indicated a greater satisfaction than did their 1963 and 1965 colleagues.

The difference between items was statistically significant (16.700) on the F test at the 5% level.

Category means by institutes for Category I is shown in Table 12 on the following page.

TABLE 12

CATEGORY MEANS BY INSTITUTES
CATEGORY I

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	3.56	2.96	2.97	3.16	2.74	3.08
1964	3.78	3.02	3.54	2.84	2.78	3.19
1965	3.50	2.92	3.30	2.66	2.90	3.06
Institute Mean	3.61	2.97	3.27	2.89	2.81	3.11

The California participants reflect a greater satisfaction with the facilities they were using in each year than did their counterparts in other institutes. Satisfaction with the facilities was greater in 1964 than in other years in three of the institutes: California, Colorado, and Florida. The 1965 group from North Carolina expressed less agreement with the items than any other group in any other year. Improvement in the extent of satisfactions can be seen by each succeeding group in Wisconsin.

Differences between institutes is statistically significant (29.223) on the F test at the 5% level. A significant interaction between year by institute is shown graphically in the table below. Means are shown on the vertical axis; years on the horizontal axis.

TABLE 13
YEAR BY INSTITUTE INTERACTION
CATEGORY I

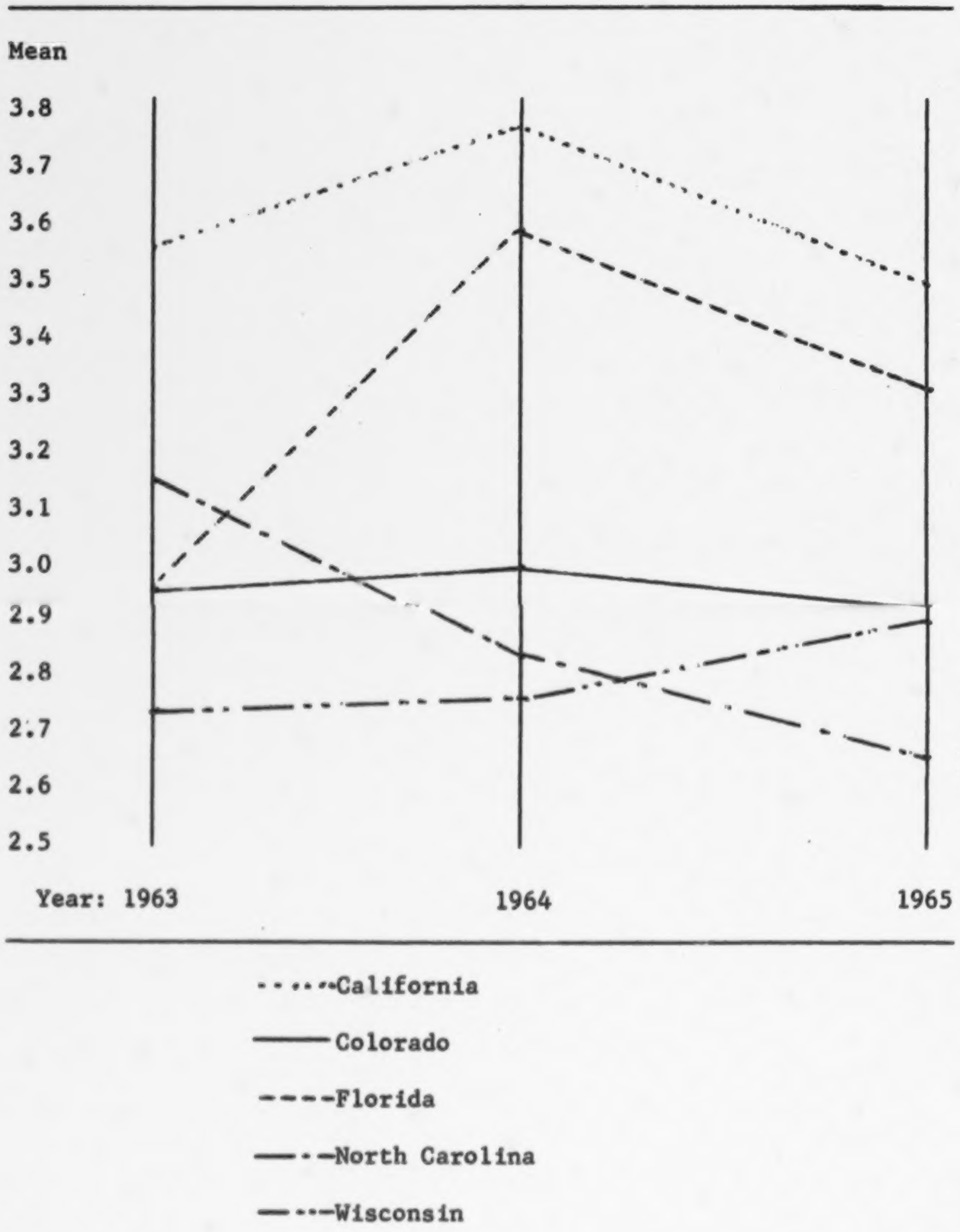
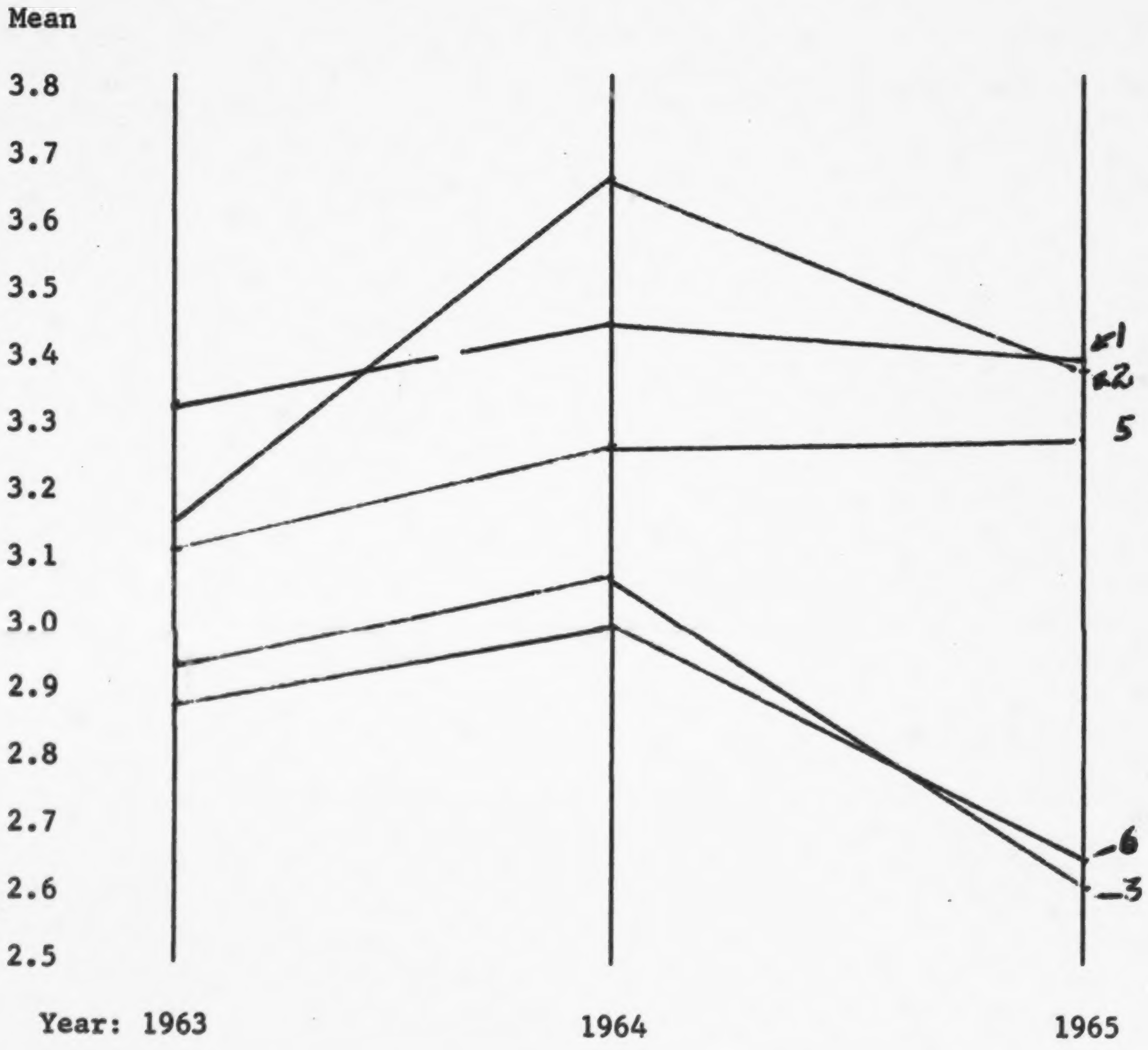


TABLE 14
YEAR BY ITEM INTERACTION
CATEGORY I



CATEGORY II--COURSES, COURSE CONTENT

7 The number of courses offered was adequate
11 The content of the courses was less than adequate
12 The subject matter was too technical

TABLE 15

ITEM MEANS BY YEARS
CATEGORY II

Item No.	1963	1964	1965	Item Mean
7	2.98	3.16	3.16	3.10
11	2.80	2.84	3.08	2.91
12	2.86	3.04	2.96	2.95
Yearly Mean	2.88	3.01	3.07	2.99

The participants agreed that the courses offered (Item 7) was adequate. The extent of their agreement was identical in '64 and '65 and was slightly higher than in '63. Content of the courses (Item 11) was adequate as is indicated with their disagreement to the negatively stated item. The 1965 participants disagreed to a greater extent than did those of the former two years. Course content (Item 12) was weighted as a negatively stated question. Participants for the three year period indicated that the course content was not too technical for them.

The difference between items was not statistically significant (2.008) on the F test at the 5% level.

Category means by institutes for Category II is shown in Table 16 on the following page.

TABLE 16

CATEGORY MEANS BY INSTITUTES
CATEGORY II

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	3.30	2.93	2.83	2.70	2.63	2.88
1964	3.27	2.83	3.17	3.07	2.73	3.01
1965	3.33	3.20	3.13	2.67	3.00	3.07
Institute Mean	3.30	2.99	3.04	2.81	2.79	2.99

California participants felt more strongly than did others that the number of courses and their content was adequate and the material was not too technical. Colorado and Florida participants were almost equal in their overall opinions toward this category. The 1964 group from North Carolina and the 1965 group from Wisconsin expressed stronger endorsement of the items than did their respective colleagues for the other two years.

The differences between institutes were statistically significant (5.075) on the F test at the 5% level. Differences due to interaction was not significant.

CATEGORY III--ORGANIZATION

13 The number of instructors was adequate
14 The number of laboratory assistants was adequate
21 The hands-on time in Unit Record labs was inadequate for me
22 The hands-on time in computer labs was inadequate for me
23 Scheduling of classes and labs was well organized

TABLE 17

ITEM MEANS BY YEARS
CATEGORY III

Item No.	1963	1964	1965	Item Mean
13	2.86	3.14	3.02	3.01
14	2.80	2.64	2.82	2.75
21	2.76	2.64	2.74	2.71
22	2.32	2.56	2.16	2.35
23	3.06	2.86	2.84	2.92
Yearly Mean	2.76	2.77	2.72	2.75

The participants indicated greater agreement with respect to adequacy of instructors (Item 13) in 1964 than they did in 1963 and 1965. This statement would also be true of the adequacy of 'hands-on' time in computer labs (Item 22). Greater agreement is expressed for adequacy of laboratory assistants (Item 14) and adequacy of 'hands-on' time in Unit Record labs (Item 21) in both 1963 and 1965 than 1964. The extent of agreement for the organization of the class and lab schedules (Item 23) decreased each year, however, the decrease was somewhat more pronounced between 1963 and 1964 than between the latter two years. The item means in the table would indicate the greatest satisfaction with Item 13 and the least satisfaction with Item 22. Indecision on part of the participants is evidenced in the adequacy of computer lab time, particularly in 1965.

Scheduling of classes and labs (Item 23) received strong endorsement in 1963 whereas 'hands-on' time in computer labs received the least as it did also in 1964 and 1965. Adequacy of instructors (Item 13) received the most favorable response in 1964 and 1965; more favorable than other items in the category, excepting Item 23 in 1963.

A significant difference between items exists (F = 11.580) on the F test at the 5% level. It was not significant between years.

Category means by institutes for Category III is shown in Table 18 on the following page.

TABLE 18

CATEGORY MEANS BY INSTITUTES
CATEGORY III

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	3.24	2.54	2.90	2.70	2.42	2.76
1964	2.76	2.78	2.76	2.72	2.62	2.73
1965	3.20	2.64	2.66	2.44	2.66	2.72
Institute Mean	3.07	2.65	2.77	2.62	2.56	2.73

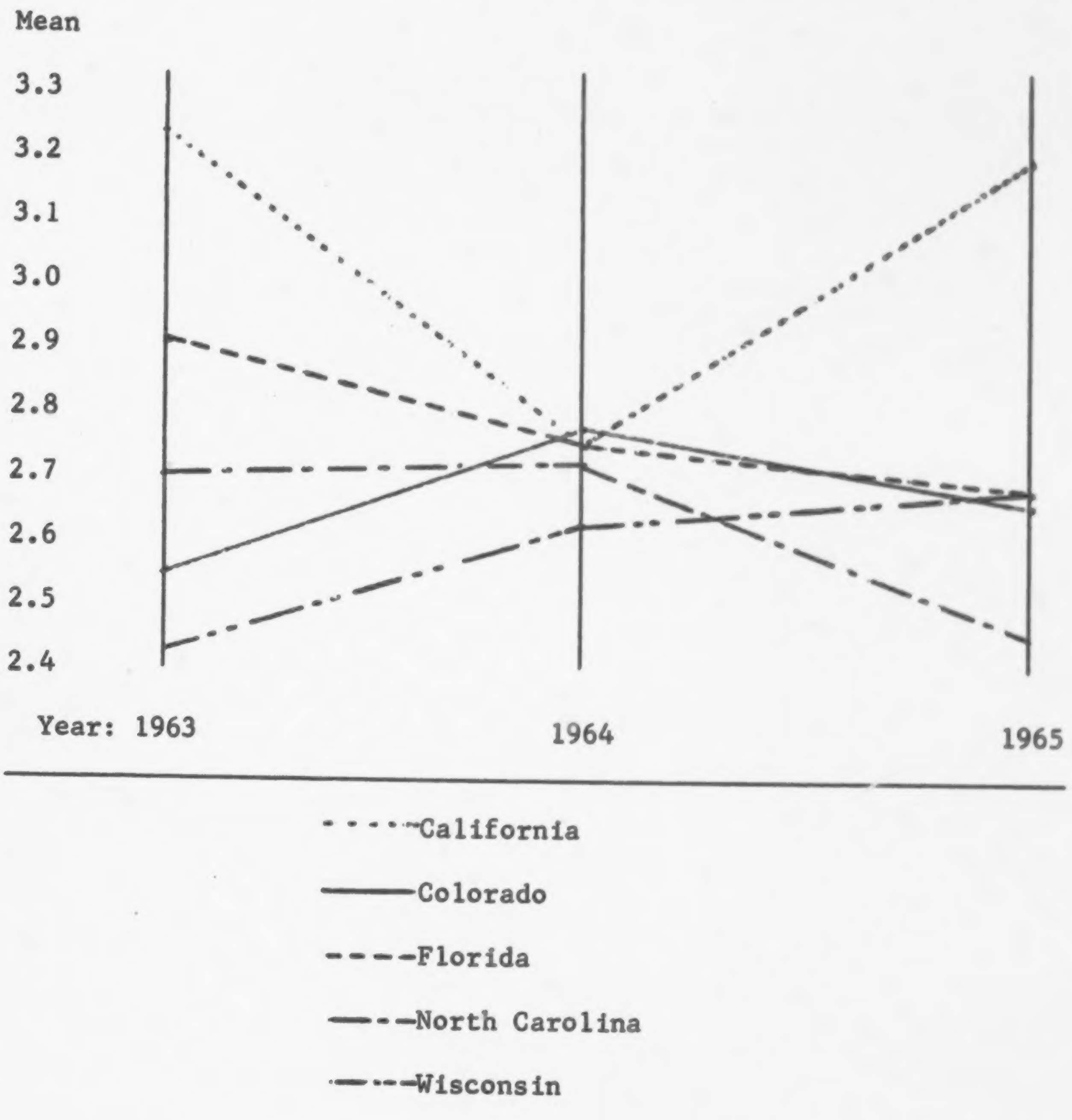
An overall category and institute mean of 2.73 indicates that most of the participants opinion of the organization as defined by these five items was favorable. The California participants were more favorably disposed toward the organization in '63 and '65; the Colorado group in '64. Wisconsin participants were least impressed in '63 and '64; North Carolina in '65. Institute organization seems to have been better in 1964 in Colorado, Florida, and North Carolina than it was in 1965. Each successive group in Wisconsin rated the items a little higher each year, whereas the opposite seems to be true of the Florida groups.

The differences between institutes were statistically significant (6.723) on the F test at the 5% level. A significant interaction exists between years and institute and is shown graphically below. Means are shown on the vertical axis; years on the horizontal axis.

TABLE 19

YEAR BY INSTITUTE INTERACTION

CATEGORY III



CATEGORY IV--STAFF

16 The instructors did a satisfactory job of teaching
17 The instructors lectured to us as though we were freshman
18 For the most part, the instructors were well prepared for each lesson
15 The instructors were highly qualified to teach the subject matter
33 The instructors devoted part of their class to teaching techniques

TABLE 20

ITEM MEANS BY YEAR
CATEGORY IV

Item No.	1963	1964	1965	Item Means
16	2.54	2.50	3.02	2.69
17	3.04	3.08	2.96	3.03
18	2.84	2.94	2.96	2.91
15	2.76	2.72	2.86	2.78
33	2.52	2.16	2.42	2.37
Yearly Means	2.74	2.68	2.84	2.75

The opinions of the participants with respect to the instructors doing a satisfactory job of teaching (Item 16) was better in 1965 than in former years. A slight decrease in favorableness was expressed by the '64 participants when compared to those of '63. Item 17 was considered as negatively stated and the means therefore reflect the opinion that instructors did not lecture as though their students were freshmen. The participants as a whole seem to support the preparedness of the instructors (Item 18) with each succeeding group being a little more favorably impressed than those of the preceding year. That the instructors were highly qualified to teach the subject matter (Item 15) is shown above. The 1965 participants were more generous in their opinions than those of the former years. To the participants, the instructor's efforts to illustrate teaching techniques (Item 33) was greater in 1963 than in the latter two years. In 1965, the participants were more favorably impressed than were the 1964 group. The instructors' devotion of time to teaching techniques (Item 33) received a lower opinion rating than any other item in each of the three years. Item 17 (quality of lectures) received the stronger endorsement of any of the items during the project period.

The differences between items was statistically significant (13.466) on the F test at the 5% level.

Category means by institutes for Category IV is shown in Table 21 on the following page.

TABLE 21

CATEGORY MEANS BY INSTITUTES
CATEGORY IV

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	2.96	3.04	2.52	2.96	2.22	2.74
1964	3.36	2.64	2.96	2.24	2.02	2.65
1965	3.20	3.04	3.06	2.58	2.34	2.84
Institute Mean	3.17	2.91	2.85	2.59	2.19	2.74

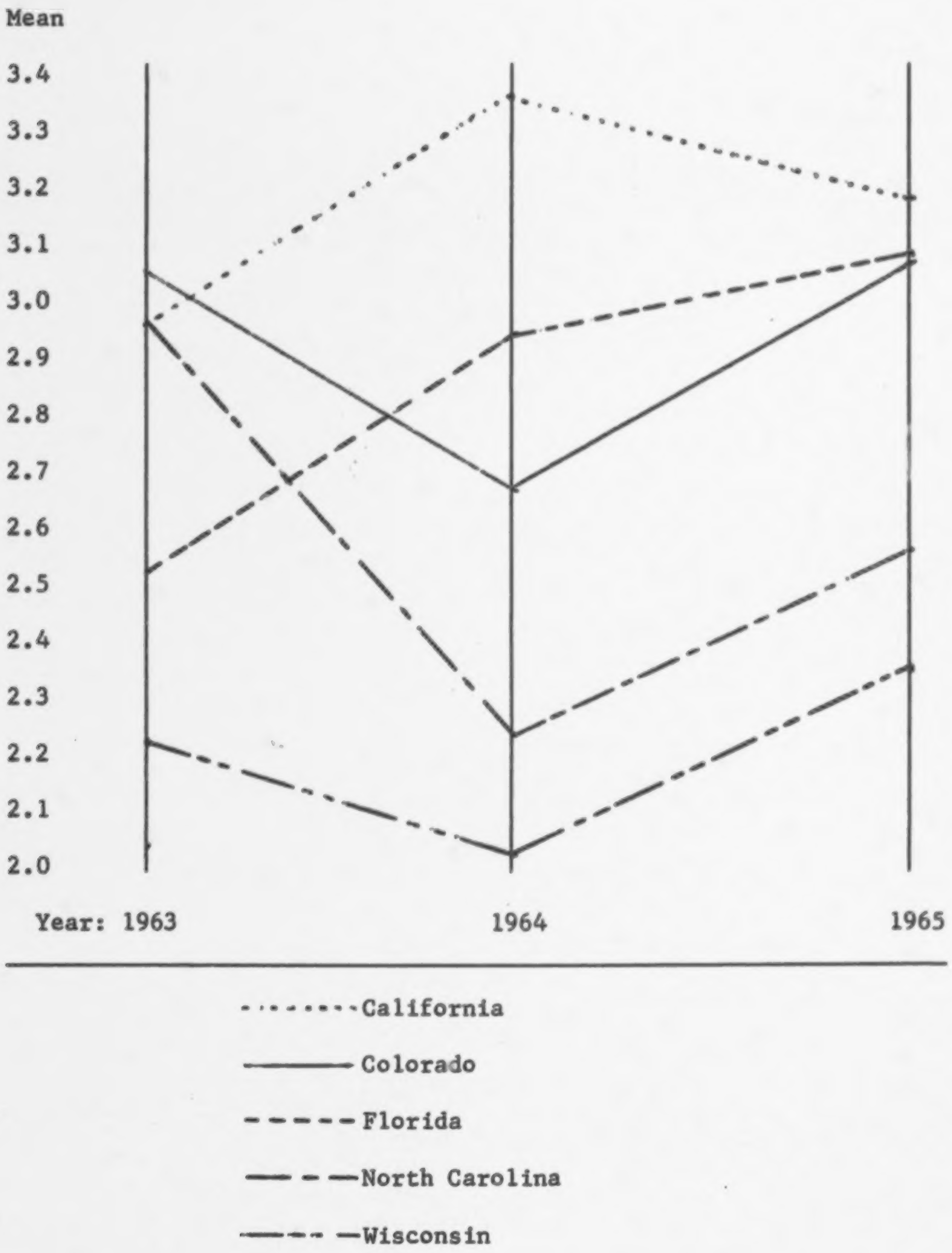
An overall category and institute mean of 2.74 seem to indicate that the participant opinions of the staff, as defined by these items, was favorable. The 1964 and 1965 California participants expressed more favorable opinions toward their staff than did their colleagues of 1963. The groups attending the Colorado and Florida institutes seem to have a rather favorable opinion of their instructors. The participants in North Carolina in 1964 did not have as high opinion of their staff, as reflected in their responses, as did others attending the same institute in 1963 and 1965. Indecision is indicated by the Wisconsin participants each year. Their opinions were more positive in 1965 than in the preceding two years.

The differences between the institutes were statistically significant (25.573) on the F test at the 5% level. A significant interaction between years and institutes exists and is shown graphically below. Means are shown on the vertical axis; years on the horizontal axis.

TABLE 22

YEAR BY INSTITUTE INTERACTION

CATEGORY IV



CATEGORY V--METHODS OF INSTRUCTION

8 The methods of instruction had many shortcomings
25 The lectures were too long
24 The subject matter was presented too fast
4 There was a noticeable lack of the use of visual aids
29 The lack of suitable textbooks was a deterrent in my learning

TABLE 23

ITEM MEANS BY YEARS
CATEGORY V

Item No.	1963	1964	1965	Item Means
8	2.44	2.30	2.70	2.48
25	2.66	2.86	2.54	2.69
24	2.40	2.58	2.34	2.44
4	3.00	2.82	3.12	2.98
29	2.72	2.92	2.96	2.87
Yearly Means	2.64	2.70	2.73	2.69

Each of the items in Category V were considered to be negatively stated, therefore, each of the means shown above would indicate disagreement with the items. Participants in 1965 felt that the methods had less shortcomings (Item 8) than they did in the two previous years. Opinions as to the length of lectures (Item 25) were more favorable in 1964 than in either '63 or '65. Similarly, opinions were favorable with respect to the speed of which the subject matter was presented (Item 24) in '64 than in other years. The greatest disagreement with any of the items was with Item 4 (lack of visual aids) thus an indication of apparent satisfaction is recorded. Participant opinions of the suitability of textbooks (Item 29) seem to agree with the instructors that the quality of the books improved throughout the project period. In 1963 and 1964 some indecision on the part of the participants was registered with respect to methods of instruction (Item 8). Participant opinions did not positively support the speed at which the subject matter was presented (Item 24).

Differences between the items was statistically significant (7.344) on the F test at the 5% level.

Category means by institutes for Category V is shown in Table 24 on the following page.

TABLE 24

CATEGORY MEANS BY INSTITUTES
CATEGORY V

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	3.06	2.70	2.58	2.52	2.36	2.64
1964	3.46	2.54	2.10	2.38	2.28	2.55
1965	2.98	3.00	2.66	2.56	2.46	2.73
Institute Mean	3.16	2.75	2.45	2.49	2.37	2.64

Participants attending the California Institute in 1963 and 1964 expressed more favorable opinions regarding the category than did participants attending others. The Colorado participants seem to express a rather high degree of satisfaction with the methods of their instructors particularly in 1965. Florida, North Carolina and Wisconsin participants expressed apparent satisfaction toward methods of instruction but not as great as those in California and Colorado. In 1964, all participants except those in California were less favorably disposed toward the category than in either of the other two years.

The differences between institutes is statistically significant (12.455) on the F test at the 5% level.

CATEGORY VI--INSTRUCTION

34 The materials that I received from the institute were very valuable in teaching
9 The subject matter was interesting
10 I was enthusiastic about learning data processing
30 There should have been more outside speakers brought in to supplement learning

TABLE 25

ITEM MEANS BY YEAR
CATEGORY VI

Item No.	1963	1964	1965	Item Mean
34	2.82	2.78	2.90	2.83
9	3.40	3.40	3.30	3.37
10	3.36	3.58	3.50	3.48
30	2.92	2.84	2.90	2.89
Yearly Mean	3.12	3.15	3.15	3.14

The materials passed out or developed at an institute (Item 34) were valuable to the participants in their back-home teaching. The opinions of 1963 and 1965 participants are slightly more favorable than those of 1964. The participants' enthusiasm for learning data processing (Item 10) was quite high as was their interest in the subject (Item 9). The 1964 participants enthusism was higher than those attending in other years. In general, they rejected the idea that more outside speakers should have been utilized (Item 30), more so in 1963 than in the later years.

The differences between items are statistically significant (20.172) on the F test at the 5% level.

Category means by institutes for Category VI is shown in Table 26 on the following page.

TABLE 26

CATEGORY MEANS BY INSTITUTES
CATEGORY VI

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	3.03	3.18	3.15	3.43	2.85	3.13
1964	3.58	3.08	3.25	3.00	2.15	3.01
1965	3.25	3.35	3.05	3.20	2.90	3.15
Institute Mean	3.29	3.20	3.15	3.21	2.63	3.10

The 1963 participants in North Carolina apparently were more satisfied with instruction as defined by this category of items, than were their counterparts attending other institutes, and than their colleagues in the two years following. California participants in 1964 expressed greater satisfactions than did others for that year. In 1965, the Colorado group were slightly more favorably disposed toward the instruction category than others. Florida participants appear to be more consistent between years than the other groups.

Differences between institutes are statistically significant (3.865) on the F test at the 5% level.

CATEGORY VII--APPLICATION

31 I felt qualified to teach data processing courses after attending the institute
32 As a result of the institute I feel that I could organize a DP curriculum
27 I had hopes the institute would be better than it was
28 The institute experience has been invaluable to me

TABLE 27

ITEM MEANS BY YEAR
CATEGORY VII

Item No.	1963	1964	1965	Item Mean
31	2.48	2.46	2.60	2.51
32	2.56	2.44	2.48	2.49
27	2.56	2.28	2.60	2.48
28	3.20	2.82	2.88	2.97
Yearly Mean	2.70	2.50	2.64	2.61

The participants generally felt they were qualified to teach data processing courses after attending an institute (Item 31), slightly more so by those attending in 1965. Some indecision is evident each year in their responses. Even more uncertainty was expressed regarding their ability to organize a data processing curriculum (Item 32). Apparently they had hopes that the institutes would be better than it was (Item 27), more so in '64. Some indecision exists. That the institute experience has been invaluable (Item 28) is evidenced by the favorable opinions as expressed in higher means as shown above.

Differences between items were statistically significant (7.125) on the F Test at 5% level.

Category means by institutes for Category VII is shown in Table 28 on the following page.

TABLE 28

CATEGORY MEANS
CATEGORY VII

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	3.03	2.80	2.48	3.00	2.20	2.70
1964	2.40	2.60	2.93	2.48	2.10	2.50
1965	2.73	2.98	2.65	2.68	2.18	2.64
Institute Mean	2.72	2.76	2.69	2.72	2.16	2.61

With respect to the category as a whole the 1963 California, North Carolina, and Colorado participants apparently felt the institutes had been quite helpful to them. Except in Florida the participants expressed some indecision in this regard in 1964. In 1965, the most positive opinions expressed were those from Colorado. When the three-year period is studied, it appears that the 1964 group were the least satisfied; the 1963 the most.

Differences between institutes were statistically significant (6.785) on the F Test at the 5% level.

CATEGORY VIII--ASSOCIATIONS

19 Not enough time was allowed to pursue activities of my own choosing
26 There were insufficient opportunities to associate with other participants
20 There was not enough contact between teacher and participant

TABLE 29

ITEM MEANS BY YEAR CATEGORY VIII

Item No.	1963	1964	1965	Item Mean
19	2.52	2.64	2.06	2.41
26	3.06	3.04	3.00	3.03
20	2.96	3.00	2.84	2.93
Yearly Mean	2.85	2.89	2.63	2.79

All three items were considered to be negatively stated, and as such, a high mean (in excess of 2.5) would be connotated as a rejection. In general, the participants felt that there was enough time and opportunity to associate with others. Whether they interpreted 'activities of their choosing' (Item 19) to mean social or educational activities is not known. They apparently felt that they had less time for these activities in 1965 than did their counterparts or their colleagues. Minute differences exist between years for Item 26, thus each group of participants felt that they had time to associate with others. They felt a little less strong about the contact between student and teacher (Item 20). The 1965 participants' opinions of these opportunities for associations was less each year than for those of 1963 and 1964.

Differences between items were statistically significant (22.652) on the F Test at the 5% level.

Category means by institutes for Category VIII is shown in Table 30 on the following page.

TABLE 30

CATEGORY MEANS
CATEGORY VIII

Year	California	Colorado	Florida	North Carolina	Wisconsin	Category Mean
1963	3.13	2.93	2.77	2.73	2.67	2.85
1964	3.10	2.87	2.97	2.77	2.77	2.90
1965	3.00	2.93	2.13	2.40	2.57	2.61
Institute Mean	3.08	2.91	2.62	2.63	2.67	2.78

California and Colorado participants appears to have been favorably impressed with opportunities to associate with other and with their staff. A sizeable difference of opinion is shown between the 1965 Florida group and its colleagues of previous years. A similar difference is evident in the North Carolina participants.

Difference between institutes was statistically significant (5.109) as was the differences between years (4.88) on the F Test at the 5% level.

SUMMARY--OBJECTIVE NO. 2

Each of the thirty-four items were arrayed in rank order according to item mean for the three-year period. One-fourth of the items obtaining the lowest means and one-fourth of the items having the highest means are listed below. The range of all item means was 2.35-3.48; and median of 2.87.

EIGHT ITEMS HAVING LOWEST MEANS

Item No. 22-3 "The hands-on time in computer labs was inadequate for me." (m = 2.35)

Item No. 33-4 "The instructors devoted part of their class to teaching techniques." (m = 2.37)

Item No. 19-8 "Not enough time was allowed to pursue activities of my own choosing." (m = 2.41)

Item No. 24-5 "The subject matter was presented too fast." (m = 2.44)

Item No. 27-7 "I had hopes the institute would be better than it was." (m = 2.48)

Item No. 8-5 "The methods of instruction had many shortcomings." (m = 2.48)

Item No. 32-7 "As a result of the institute I feel that I could organize a DP curriculum." (m = 2.49)

Item No. 31-7 "I felt qualified to teach DP courses after the institute." (m = 2.51)

EIGHT ITEMS HAVING HIGHEST MEANS

Item No. 10-6 "I was enthusiastic about learning data processing." (m = 3.48)

Item No. 2-1 "The physical factors (color, light, accoustics) were satisfactory." (m = 3.39)

Item No. 1-1 "The meeting rooms were of adequate size." (m = 3.38)

Item No. 9-6 "The subject matter was interesting." (m = 3.01)

Item No. 13-3 "The number of instructors was adequate." (m = 3.01)

Item No. 4-5 "There was a noticeable lack of the use of visual aids." (m = 2.98)

Item No. 28-7 "The institute experience has been invaluable to me." (m = 2.97)

Item No. 12-2 "The subject matter was too technical." (m = 2.95)

To summarize these findings and thus depict more clearly strengths and weaknesses of the institutes as perceived by the participants, a chart of category means by years has been constructed and is shown in Table 31 below.

TABLE 31

SUMMARY

MEANS AND RANK BY CATEGORY AND YEAR

Category	1963		1964		1965		Mean	
	Means	Rank	Means	Rank	Means	Rank	Means	Rank
1--Facilities	3.08	2	3.19	1	3.06	3	3.11	1
2--Courses	2.88	3	3.01	2	3.07	2	2.99	3
3--Organization	2.76	5	2.73	4	2.72	6	2.73	6
4--Staff	2.74	6	2.65	5	2.84	4	2.74	5
5--Methods of Instruction	2.64	8	2.55	6	2.73	5	2.64	7
6--Instruction	3.13	1	3.01	2	3.15	1	3.10	2
7--Application	2.70	7	2.50	7	2.64	7	2.61	8
8--Associations	2.85	4	2.90	3	2.61	8	2.78	4
Yearly Means	2.85		2.82		2.85		2.84	

Considering the eight categories as a group, the participants' opinion in 1963 and 1965 were identical (2.85) and only slightly better than those who attended in 1964. Differences of opinion between years is reflected by changes in means but more specifically by changes in rank order. The most significant change in rank order of the categories is in Category VIII (associations) in 1965. Item 19 (time to pursue activities of own choosing) which was included in this category obtained the third lowest mean of all items. None of the items in the upper one-fourth group were included.

Strengths of the Institutes

From the table above, Category I--Facilities, is ranked in first position, thus reflecting favorable opinions of the participants with respect to adequacy of physical facilities including room size, comfort factors, and the amount of automated data processing equipment.

Ranked in the second position is Category VI which contained two items in the list of those having high means. These items were No. 10 (enthusiastic about learning data processing) and No. 9 (the subject matter was interesting). It would seem that a strength of the project was the pass-out materials (Item 34) and the ability of the staff to motivate the participants.

The number of courses, and their content (Category II), should also be viewed as a strength of the project. Category II was ranked second by the 1964 and 1965 participants and third by the 1963 group.

WEAKNESSES OF THE INSTITUTES

Category VII (Application) is ranked in the last position and contained three items which are shown above as having low means. Those three items were numbers 27 (had hopes institute would be better than it was); 31 (felt qualified to teach DP courses after attending an institute); and, 32 (felt I could organize a DP curriculum). One item in the category, no. 28 (the institute experience has been invaluable to me), is listed among those obtaining a high mean.

It appears then that the institute project was weak in the opinions of the participants each year with respect to giving them confidence to organize a data processing curriculum and to teach data processing courses.

Participant opinions of Category V as reflected by means was lower in 1964 than in 1963 or 1965 but was ranked in last position in 1963. Overall ranking of the category places it next to last or in the seventh position. Included are two items from the list of the lowest eight. These items are: No. 24 (subject matter was presented too fast), and No. 8 (methods of instructions had many shortcomings). It also contained one item in the list of eight having a high mean (No. 4--use of visual aids).

The opinions of the participants indicate a second weakness of the project, that being the subject matter was presented too fast. One cannot say with confidence that a relationship exists between the presentation of subject matter (Item 24) and the adequacy of computer lab time (Item 22). Intuitively, however, one appears to exist as the participants have expressed rather strongly that eight weeks was about right for the institute length.

A third weakness as indicated by the participant opinions is the general topic of organization (Category III). This topic was ranked sixth for the project period as it was by the 1965 participants. The 1964 group would rank it in fourth place, yet there is little difference in means between years. Satisfactions are evident with respect to the number of instructors and their assistants and with hands-on time in Unit Record labs.

Indecision and dissatisfaction, however, is evident with respect to scheduling and particularly to adequacy of time in computer labs. Adequacy of instructors (Item 13) is among those items having a high mean, whereas adequacy of hands-on time in Computer labs (Item 23) obtained the lowest mean of any item.

To summarize the findings yet in a different manner a second chart was constructed of category means by institutes and is shown in Table 33 on the following page.

In Table 32 below it can be seen that the California participants for the three-year period held a more favorable opinion of their institute than any other group.

TABLE 32

RANK ORDER OF INSTITUTE MEANS

Rank	Institute	Institute Mean
1	California	3.24
2	Colorado	2.91
3	Florida	2.86
4	North Carolina	2.75
5	Wisconsin	2.52

Presented on the following pages is an analysis of differences between institutes regarding those strengths and weaknesses identified in the preceding paragraphs.

TABLE 33

INSTITUTE MEANS AND RANK BY CATEGORIES

Category Number--Name	California		Colorado		Florida		North Carolina		Wisconsin		Category Mean
	Means	Rank	Means	Rank	Means	Rank	Means	Rank	Means	Rank	
1--Facilities	3.61	1	2.97	3	3.27	1	2.89	2	2.81	1	3.11
2--Courses	3.30	2	2.99	2	3.04	3	2.81	3	2.79	2	2.99
3--Organization	3.07	7	2.65	7	2.77	5	2.62	6	2.56	5	2.73
4--Staff	3.17	4	2.91	4	2.85	4	2.59	7	2.19	7	2.74
5--Methods of Instruction	3.16	5	2.75	6	2.45	8	2.49	8	2.37	6	2.64
6--Instruction	3.29	3	3.30	1	3.15	2	3.21	1	2.63	4	3.10
7--Application	2.72	8	2.76	5	2.69	6	2.72	4	2.16	8	2.61
8--Associations	3.08	6	2.91	4	2.62	7	2.63	5	2.67	3	2.78
Mean	3.24		2.91		2.86		2.75		2.52		2.84

STRENGTHS

Facilities:

Participants in California, Florida, and Wisconsin expressed their most forward opinion toward this category. North Carolina participants' opinions would place it second; Colorado participants third.

Instruction:

Participants attending the Colorado and North Carolina institutes gave their most favorable opinions to the topic of Instruction (Category VI). Florida participants ranked the category second; California, third; and, Wisconsin, fourth.

Courses:

The opinions of the participants attending the California, Colorado, and Wisconsin institutes would place this category in second place; Florida and North Carolina participants would have ranked it third.

WEAKNESSES

Application:

Helpfulness of the institutes (Category VII) obtained the lowest overall mean of any category. Variation in means and particularly in rank order is evident by the findings in which California and Wisconsin participants would rank it in last place, Florida in sixth, Colorado in fifth, and North Carolina in fourth. The Wisconsin participants' opinions appear to reflect dissatisfaction with their training and apparently felt that they were inadequately prepared.

Methods of Instruction:

The overall mean for Category V was 2.64 and a rank of 7. Florida and North Carolina participants' opinions are divided indicating both satisfaction and dissatisfaction. These two groups ranked the category in last place, whereas, Colorado and Wisconsin participants ranked it sixth and California, fifth.

Organization:

Ranked in seventh place by California and Colorado participants, the hands-on time in computer labs problem becomes evident once more. North Carolina would rank it in the sixth position, Florida and Wisconsin in fifth.

The questionnaire which was completed by the 251 participants contained a number of questions, some of which were designed to elicit data relative to determining strengths and weaknesses of the institutes. These questions were in addition to Part III which has already been analyzed. Following are responses.

19. Would you recommend the institute training, if offered, to one of your qualified colleagues?

    Endorsement of the institute training to the extent that it would be recommended is shown below.

TABLE 34

RECOMMENDATION OF INSTITUTES BY PARTICIPANTS

Institute	Yes No.	Yes %	No No.	No %	No Response	Total
California	46	93.9	1	2.0	2	49
Colorado	80	94.2	1	1.2	4	85
Florida	25	86.2	1	3.4	3	[illegible]
North Carolina	37	84.1	2	4.5	5	44
Wisconsin	32	72.7	6	13.6	6	44
Total	220	87.6	11	4.4	20	251

Of the respondents who had attended in California, Colorado, Florida, and North Carolina, an excess of 80% would recommend the training. Approximately 73% of those attending the Wisconsin institutes would recommend it to qualified colleagues.

27. Did you feel that eight weeks was about right with respect to length for the institutes?

TABLE 35

PARTICIPANT RESPONSES REGARDING LENGTH

Institute	Yes No.	Yes %	No No.	No %	No Response	Total
California	39	79.6	9	18.4	1	49
Colorado	71	83.5	9	10.6	5	85
Florida	26	89.7	2	6.9	1	29
North Carolina	36	81.8	3	6.8	5	44
Wisconsin	30	68.2	10	22.7	4	44
Total	202	80.5	33	13.1	16	251

Satisfactions of the participants with respect to the length of the institute is expressed by approximately 80% (202) of the respondents. Comments from those who responded negatively ran about 50% in favor of reducing the length. Some suggested that too much was being attempted during the summer.

A greater percent of the Florida participants responded affirmatively, whereas the Wisconsin participants were more critical of the length.

13. Have you taken a different position in another school since attending an institute? If so, could you attribute this change to your attendance in an institute? Responding to the question was 239, of which 51 (23.3%) had changed jobs. Twenty-seven (52.9%) of those who took different positions attributed their move to attendance at the institute.

14. Have you received a promotion in rank or other advancement since the institute? If so, could you attribute the promotion to your institute experience? The response to the first question was 117 yes (49%) and 122 no. Of those giving a "yes" response, 81 (69.2%) attributed the advancement to their attendance.

15. Are you better off financially as a result of your attendance? Responding was 235, and 107 (45.6%) felt the institute experience had been financially rewarding.

18. Do you enjoy greater status than you did before your institute experience? Responding was 233; 145 (62.2%) replied affirmatively. Of the 145, 88% (128) attributed this greater status to their attendance.

An attempt was made to determine the number of participants who had left educational systems and what impact, if any, the institutes had made.

Twelve questionnaires were returned by participants who are no longer associated with a school system. Of these twelve, two were employed in governmental agencies, two in industry, and five in business. Seven of the twelve participants have used their training in data processing. None of the respondents would attribute their leaving a school system to the institute training.

To the question of what extent the institute training had helped to prepare them for the position they now hold, nine felt it had been helpful and extremely helpful. Two felt it hadn't helped at all.

Among the reasons given for leaving the classroom were: poor administration, poor salaries, desire to do research, segregation, to work on advanced degrees.

To further assess the strengths and weaknesses of the institute project from a broader perspective and a macro-approach, a staff critique is included. This critique includes opinions of instructors and institute directors with reference to selection of participants, facilities, organization, scheduling, and miscellaneous topics.

STAFF CRITIQUE

Included in the staff critique are the opinions and judgments of the institute directors and instructors. The data upon which this portion of the report is based was gathered through interviews and a questionnaire. Sixteen instructors and five directors make up the population of this reference group.

Objectives

Eighteen thought the objectives of the project had been accomplished well and extremely well. Three felt that they had been partially accomplished.

Selection of Participants

In general the staff was pleased with the selection criteria. They expressed satisfaction with the participants, the appropriateness of their background, their willingness to work, intellectual curiosity, concern for applicability of techniques, and their aspirations. Twenty-four applicants to the 1963 institute were rejected due to the lack of facilities. Total rejections are not known. There was reasonable certainity among the directors that the state directors made some rejections, but the number or the reasons cannot be ascertained with any degree of confidence.

Some dissatisfactions were expressed with respect to adequacy of notice to prospective participants. These dissatisfactions, although real, were not criticisms of the state directors. In 1964 and more specifically in 1965 approvals for funding the project were not given until late spring. By that time a considerable number of inquiries had been received from teachers desiring training. The late approvals hampered the efforts not only of teachers who were anxious to finalize plans for attending an institute, but of those teachers' administrators. It hampered also the necessary preplanning by the institute director and his staff.

Some dissatisfaction was also felt by the staff with respect to the screening of participants by the state directors. The majority of the institute directors did not feel that the state directors approved only those candidates who met eligibility requirements. That this dissatisfaction is a criticism is dependent upon an interpretation of the eligibility requirements and the perspective held. The institute directors seem to interpret Criterion No. 4 (available for a teaching assignment in Title VIII business data processing program--1964 brochure) to mean that an applicant would be teaching in such a program in the year following his summer institute experience. Whether or not the state directors held this same point of view is doubtful. The institute directors apparently felt some compulsion to accept an applicant which a state director had approved, even though there was some doubt about the applicant's ability.

Facilities

Because of the nature of the institute project, facilities have been categorized. In the first category are environmental conditions, and in the second is data processing hardware. The staff felt that classroom space, work space, teaching aids, ventilation, participant quarters, and eating facilities were satisfactory or commendable. Library facilities were not as strongly endorsed. With respect to the equipment category, judgments of the staff were positive toward amounts and kinds of hardware and its availability for participant usage. Unit record equipment in all institutes for the three-year period was available for a mean of 5.8 hours daily; computer equipment was available for a mean of 4.7 hours in the first-year program.

In the second-year program, unit record equipment was not used extensively but it was available for two hours daily to participants. Computer equipment was available 4.5 hours.

Organization

A commendable or satisfactory rating was applied by the staff to the overall organization of the institute project. The number of institutes and their location were felt to be adequate. Two institute directors expressed the opinion that more institutes should have been established in 1964 and 1965 believing that the expansion in the usage of ADP equipment which was taking place was contributing to an even greater shortage of teachers.

Other aspects of organization such as sufficiency of preplanning, smoothness of operation, adaptability to obstacles and feedback, and sensitivity to grievances were satisfactory. Adequacy of financial support of program was rated satisfactory also; however, the approval for funding problem became evident once more. When stipends were included in the 1965 budgets, some misunderstanding developed relative to the procedures which were to be followed by institute directors.

In 1963 and 1964 when stipends were not paid universally, some dissatisfactions were expressed by participants to the institute staff. Four of the directors felt that, because of the lack of uniformity of compensations paid to participants, some morale problems were evident but not so great as to adversely affect learning.

Scheduling

Staff satisfactions are evident with respect to appropriateness of 8 weeks for the institute, time spent efficiently, events sequenced appropriately, punctuality, balance between formal and informal affairs, quality and quantity of discussion, quality of formal presentations, and methods of evaluation. A preponderance of commendable and satisfactory ratings were assigned to each of the above items.

Outside speakers were thought to be beneficial by 70% of those responding. Many of the staff expressed displeasure with the selection of salesmen as speakers because of biased view points and lack of knowledge of other manufacturers' equipment. Many of the speakers were too general in their presentations.

Visitations to computer installations were also thought to be helpful by 87%, particularly when a firm's representative made an effort to illustrate the usages his firm was making of the equipment. In a number of installations the hardware was exhibited as a device with which to play games, print pictures, and fascinate the onlookers with its fabulous speed. This approach is appealing and is generally understood, but its contribution to a group of teachers faced with learning as much of the field as they can on one hand; and on the other, are faced with problems of constructing lesson plans and developing assignments for a group of data processing students, is not very great.

Selection of speakers and sites to be visited were improved upon with each experience.

Outcomes

The intended content that was actually taught was ranked as satisfactory and commendable by the staff. Three of the directors felt that while the content was and could be covered in the eight-week period, it was a vigorous undertaking. The institute day was seven hours of lectures and laboratory; however, for the instructors and particularly the participants, the day extended often to ten and eleven hours. A new language of business was being learned, suitable textbooks and reference materials were inadequate especially in 1963, and to polish off an already frustrating summer of hard work, many participants were faced with making plans for teaching the same courses they were taking.

Other outcomes such as increase in participant understanding and improvement in attitude toward automated business data processing were rated as commendable by a majority of the staff.

General

An attempt was made to assess the effectiveness of the institute project in training teachers in business data processing. Staff members were asked to rank five types of programs: summer institutes, undergraduate programs, graduate programs, equipment manufacturers' schools, and proprietary schools. Eleven felt the institutes would be most effective; two chose the undergraduate program, and ten would prefer graduate programs. A number of comments seem to suggest that until the four-year colleges and universities accept a responsibility for training teachers in the field, institutes and "crash programs" are urgently needed.

Twenty-one (100%) felt that there was a need for the institutes to be continued.

Pedagogy

The amount of time expressed as a percentage of the lecture period which was spent in showing participants how to teach data processing courses is shown below:

PERCENT OF LECTURE PERIOD
DEVOTED TO PEDAGOGY

Number of Instructors	Percentage
2	0
7	10
3	20
2	30
1	40
1	50

When the institute designer's thinking is considered, the above findings indicate an existing congruence between intents and observed outcomes.

Third-Year Program

Should a third-year program be established? Ninety per cent reported these were strongly needed or needed. One reported that it was needed somewhat, and one reported that it was not needed. A number of topics and courses were suggested. Those mentioned most often were:

Work experience programs
Comprehensive and sophisticated data processing projects
Advanced systems problems
Advanced programming (particularly with disc and tape units)
Programming the larger and newer third-generation computers

While most agreed that the teachers were given a good background, especially those who had attended two summers, the staff seemed to be concerned that in view of the rapidly changing technology the background was to an extent meager and the teachers' newly acquired skills and knowledge were subject to obsolescence. Refresher courses in an institute project were suggested as a possible offset. Other alternatives were manufacturers' equipment schools and graduate programs in universities.

OBJECTIVE 4--TO ATTEMPT TO DETERMINE WHETHER ANY OF THE FOLLOWING FACTORS ARE RELATED TO WHETHER OR NOT THE PARTICIPANT PERSISTS AS A DATA PROCESSING TEACHER.

a. Age
b. Work Experience Prior to the Institute
c. Educational Experience Prior to the Institute
d. Grades in Institute Courses
e. Receiving or Not Receiving a Subsistance Allowance While Attending the Institute.

From the returns of 251 useable questionnaires, pertinent data was tabulated in the following categories by institutes and by years.

- Personal data
    - Age
    - Subsistance received

- Prior work experience
    - None
    - Business
    - Industry, government, military

- Prior teaching experience
    - Business education
    - Mathematics
    - Administration

- Degrees held
    - None
    - Bachelor
    - Master
    - Doctorate

- Courses taught before and after institute experience
    - Accounting, auditing
    - Banking, insurance
    - Business law
    - Statistics
    - Office Machines
    - Marketing, merchandising
    - Computer programming
    - Unit record courses

When the 73 participants who had taught neither a Unit Record course nor a Computer programming course were identified, a second tabulation was made. The profile prepared of this latter group was identical to the tabulation described above.

Several factors including those pointed out in the objective above are analyzed and discussed on the following page.

SEX:

Of the 251 respondents, 189 (75.2%) were men and 62 (24.8%) were women. In Table 36 is a distribution of the 73 participants who have not taught one of the specialized courses.

TABLE 36

SEX OF 73 PARTICIPANTS NOT TEACHING
SPECIALIZED COURSES BY INSTITUTE

Sex	California	Colorado	Florida	North Carolina	Wisconsin	Total	Percent
Male	10	10	7	9	15	51	69.86
Female	1	9	3	7	2	22	31.14
Total	11	19	10	16	17	73	100.00

A chi-square contingency table was used to test for significant differences. The difference was not significant ($X^2 = 1.63$) at the 5% level. The median number of men per institute is 10 and women per institute is 4. The median total per institute is 15.

SUBSISTANCE:

In 1965, each participant received travel allowances and per diem. In 1963 and 1964, however, reimbursement for training expenses, if made at all, was born by the sending state or school system. An attempt was made to determine whether the receiving or not receiving of a subsistance allowance while attending an institute was related to whether or not the participant persists as a data processing teacher. The data necessary to make this determination were recorded from the questionnaire. Thirty-six of the respondents failed to check whether or not they had received a subsistance allowance. Of the 215 who did respond, 162 (65.54%) reported they had been reimbursed; 53 (21.12%) reported they had not.

Table 37 on the following page shows a distribution of the 73 participants by institutes relative to this factor.

Differences were tested for significance by the chi-square technique. The difference ($X^2 = .074$) at the 5% level was not significant. The median number per institute who had received a subsistance allowance was 11; for those not receiving financial help was 3.

TABLE 37

PARTICIPANTS RECEIVING AND NOT RECEIVING SUBSISTANCE BY INSTITUTE

Subsistance	California	Colorado	Florida	North Carolina	Wisconsin	Total	Percent
Received	8	14	8	13	13	56	76.71
Not Received	3	5	2	3	4	17	23.29
Total	11	19	10	16	17	73	100.00

DEGREES

Data to analyze differences between participants who had and who had not taught the specialized courses relative to degrees was taken from the application forms. The forms had been submitted by each participant prior to his approval for training. Of the 251 participants, six (2.39%) did not have a degree; 91 (36.25%) had earned the Bachelor's degree; 147 (58.57%) had been granted the Master's degree; and, seven (2.79%) had earned the doctorate.

Table 38 shows a distribution of the 73 participants by institutes according to the degrees held.

TABLE 38

DEGREES OF 73 PARTICIPANTS BY INSTITUTE

Degree	California	Colorado	Florida	North Carolina	Wisconsin	Total	Percent
Bachelor	1	4	4	8	7	24	32.74
Master	10	15	5	8	10	48	66.03
Doctorate	0	0	1	0	0	1	1.23
Total	11	19	10	16	17	73	100.00

The degree differences between the 73 participants who had not taught a specialized course in data processing and those who had when this factor is considered is not significant ($X^2 = 2.39$) at the 5% level.

PRIOR WORK EXPERIENCE

Data relative to this factor was available on the application forms. Work experience of the participants was classified into three categories: None, Business, and Other and Military. From a study of data based on 251 respondents, it was ascertained that 53 (17.1%) did not have prior work experience; 193 (57.1%) had experience in business, and 87 (25.4%) had worked in industry, government, or had been in military service.

The same classification of work experience utilized in the study of the 73 respondents is shown below in Table 39. In this table is a distribution of the 73 participants by institute and a report of their work experience.

TABLE 39

PRIOR WORK EXPERIENCE OF 73 PARTICIPANTS
BY INSTITUTES

Experience	California	Colorado	Florida	North Carolina	Wisconsin	Total	Percent
None	1	3	0	7	1	12	13.48
Business	8	16	9	8	14	55	61.18
Other and Military	6	4	5	3	4	22	25.34
Total	15	23	14	18	19	89	100.00

A chi-square contingency table was used to test for significant differences. The difference was not significant ($X^2 = 3.935$) at the 5% level. Considering the data above, the median number of participants who did not have work experience was 2; who had business experience was 11; other and military was 4.

PRIOR TEACHING EXPERIENCE:

Data to analyze prior teaching experience came from the application for training form and was classified according to the following types of positions: business education teacher, other subject matter, and administrative. A study of the 251 respondents revealed that 203 (80.9%) were business education teachers, 29 (11.6%) taught other subjects, and 19 (7.6%) held administrative or counseling positions.

Prior teaching experience for the 73 participants who had taught neither of the specialized courses is shown in Table 40 below.

TABLE 40

TEACHING EXPERIENCE OF 73 PARTICIPANTS BY INSTITUTE

Experience	California	Colorado	Florida	North Carolina	Wisconsin	Total	Percent
Business education	10	17	5	12	12	56	76.7
Other	1	1	3	3	2	10	13.7
Administrative	0	1	2	1	3	7	9.6
Total	11	19	10	16	17	73	100.0

Differences were computed using a 3 x 2 chi-square contingency table. The difference ($X^2 = 1.257$) was not significant at the 5% level. The median number of participants per institute as a business education teacher was 11; as a teacher of other subject matter areas was 2; and, as administrator was 1.

GRADES:

The grades earned by participants could not be analyzed. In order for the participants to receive graduate credit in the California, Florida, North Carolina, and Wisconsin institutes, arrangements with a senior institution had to be made. Due to the variance in reporting of those grades which was necessitated by agreements between senior colleges and institutes, and the variation between courses offered, it was impossible to develop a consistent and uniform grade pattern. Therefore, grades could not be used in the attempt to determine whether or not they were related to persistence in teaching data processing.

As none of the factors above seemed to have a relationship as to whether or not a participant persists as a data processing teacher, the investigation of this phenomena continued. Twelve of the respondents were no longer associated with a school system, thus reducing the number who had received the training and who were associated with a school system. Neither present positions by type of school nor the dates of attendance at an institute revealed any significant differences. Nine of the seventy-three had attended two summer institutes, three of which have left the profession. Of the 61 who were still members of the profession 42 or 68.8% were associated with a school system which did not have an automated data processing program.

In view of the shortage of data processing teachers, it would seem desirable that the selection process of any future institutes be revised, To include only participants coming from a system having an established two-year preparatory program or which will initiate one immediately upon the training of its teachers.

SECTION III

A STUDY OF THE NEED FOR DATA PROCESSING TEACHERS

The purpose of this section is to report those findings related to the fifth objective: TO ATTEMPT TO DETERMINE WHETHER THERE IS A SHORTAGE OR POTENTIAL SHORTAGE OF DATA PROCESSING TEACHERS. It would seem that in a study of supply and demand for these teachers, some investigation into the unwanted but relevant side effects should be included.

Upon the recommendation and encouragement of consultants, this phase of the study was expanded to include a survey of reference groups other than those listed in the original proposal. Data in this section is based upon returned questionnaires which were sent to five reference groups. The composition of these groups is as follows: Post-secondary two-year schools having an established reimbursable two-year preparatory program in data processing; post-secondary two-year schools not known to have a preparatory program in data processing; proprietary business colleges; four-year collegiate schools having a business teacher training program; and, state directors who were responsible for vocational data processing programs.

INSTRUMENTATION

Under each of the subtopics which follow is a description of the instrument used in gathering data from the various reference groups. As with most survey-type studies, the mail questionnaire is a primary media of the data collection system.

Input--A:

A questionnaire was developed to gather information from post-secondary two-year schools which had an established reimbursable data processing preparatory training program. The purpose was to attempt to identify staffing characteristics, problems related to staff acquisition, and needs for data processing teachers. To identify the population, a letter was mailed to each state director for vocational education who was asked to supply a school name and address of these schools. Responses from 94.2% of the fifty states and two territorial possessions were received. Eight states and one territorial possession did not have a reimbursable program in data processing; the remainder had a total of 221. From this number, a sample size of 30 was randomly selected for study. A listing of these thirty schools together with the questionnaire which was mailed to them are given in the appendices. Twenty-seven (90%) returned the instrument. The number of programs in the states ranged from 0-29; the mean per state was 4.33.

Input--B:

A questionnaire was developed to gather information from post-secondary two-year schools which did not have a known reimbursable preparatory business data processing program. The gross population of 284 members was selected from EDUCATION DIRECTORY 1965-66, PART 3, HIGHER EDUCATION. This source contains a number of classifications into which institutions had been categorized. A description of the classification used in determining the population is as follows:

> Two, but less than four, years of work beyond the 12th grade--includes junior colleges, technical institutes, and normal schools offering at least a two-year program of college-level studies.

From the gross population, those having an established two-year preparatory program in data processing were eliminated, thus giving a net population of 254. A sample of 30 was randomly selected for questionnaire administration. A listing of those schools querried and a copy of the questionnaire is shown in the appendices. Twenty-six schools (86.6%) returned the instrument. Three schools had an established two-year non-reimbursable program; five schools had approval to begin programs in 1967.

Input--C:

Another reference group studied was the proprietary business schools. A copy of the OFFICIAL DIRECTORY OF ACCREDITED INSTITUTIONS and OPERATING CRITERIA 1966-67, published by the Accrediting Commission for Business Schools, 1404 Schools Center Building, 5057 Woodward Avenue, Detroit, Michigan, 48202, was obtained. The Commission accredits business schools in four classifications: One-year Business Schools; Two-year Business Schools; Junior Colleges of Business; and Senior Colleges of Business (four-year schools). The classification chosen for this study was the two-year business school which is defined by the Commission as a post-high school institution which offers at least one program of instruction, two school years in length, the objectives of which are measured primarily in terms of vocational competence, and completion of a course is determined to a large degree through the measurement of skill attainment. It may not consist of a combination of two- and one-year programs unless one is a prerequisite to the other.

Using the two-year business school classification, the Official Directory contains a population of 189 educational systems. From this universe, a sample of 30 was randomly drawn for study. A questionnaire was developed and mailed to gather data. The questionnaire and a listing of the institutions included in the sample is shown in the appendices. Responding were 26 systems or 86.6%.

Input--D:

Another reference group studied was teacher-training institutions which have as an objective to prepare business and office education teachers. Because the institute project was designed to retrain business teachers in business data processing, it appeared appropriate to ask what, if any, were these institutions doing with respect to training data processing teachers. From the membership roster of the National Association of Business Teacher Education, which is a division of the National Business Education Association (an NEA affiliate), a sample size of 30 was randomly selected for survey purposes. The roster contained 296 names and addresses and was thus considered the population from which the sample was drawn. A questionnaire was developed and mailed. The instrument and the institutions selected are presented in the appendices. Responding were 24 systems or 80%. One was received after the data was tabulated and is not included in the findings.

Input--E:

The final reference group to be studied was the state directors for vocational data processing programs (hereafter referred to as state directors). The population was made up of the fifty state directors and two territorial possessions. A questionnaire which was developed and mailed to the entire population, is shown in the appendices. Responding were 46 or 88.5%. The purpose of studying this population was to attempt to gain yet another perspective of problems associated with data processing programs, to attempt to learn of programs which were about to be approved (thus revealing further the needs for teachers of data processing), and to attempt to learn of efforts being made in the states for the training of data processing teachers.

Organization of Section 2

The findings, based upon data which were gathered from the above reference groups, are shown under the following headings: Needs for Data Processing Teachers, Staffing Characteristics, Teacher Preparation in Data Processing, and Problems Associated with Data Processing Programs.

ACTUAL AND POTENTIAL NEEDS FOR DATA PROCESSING TEACHERS

It is recognized that when one asks of state directors an estimated need for data processing teachers and also asks of school administrators an identical question, the estimate of the directors is likely to include the estimate of the administrators--particularly those of whom the director has knowledge. Care has been exercised in reporting the needs as derived from these two groups so that duplication has not taken place or reported.

From an analysis of the data gathered from schools with a program (Input A) there is an estimated need of 1.8 teachers per program during each of the three-year periods of 1967, 1968, and 1969. Table 41 shows the number needed per year.

TABLE 41

ESTIMATE OF DATA PROCESSING TEACHERS NEEDED
BY 27 SCHOOLS HAVING A 2-YEAR DP PROGRAM

Reason Needed	1967	1968	1969	Totals
Resignation, Health, Retirement	15	14	21	50
Program Expansion	31	31	37	99
Totals	46	45	58	149
Mean	1.7	1.7	2.2	1.8

If one could assume that each of the 221 two-year preparatory programs which were established and operating at the time of survey administration, had need of 1.8 teachers; then administrators will be searching for approximately 400 teachers during each of the next three years. This figure applies only to reimbursable programs and thus indicates some of the competition which will take place between administrators of high schools, post-secondary schools, private schools, and four-year collegiate schools.

Consideration should also be given to the estimated need for these teachers by the state directors. From Input E--(Survey of State Directors) the need is estimated at 350 teachers at the present time. Seventy percent of the directors indicated there was a shortage in their states which is shown on the following page.

TABLE 42

ESTIMATE OF DATA PROCESSING TEACHERS NEEDED BY TYPE OF PROGRAMS

Business Data Processing	236
Scientific Data Processing	45
Combination of the above	69
Total	350
Needed by Types of Schools	
High Schools	135
Two-Year Post-Secondary Schools	215
Total	350

The number of teachers needed for two-year preparatory training programs would be bounded on the lower side by 350 as reported by state directors and on the upper side by 400 as indicated from an analysis of data gathered from schools which have an established program. The basis upon which the state director made his estimate is not known. He may have considered only established programs; he may have included programs soon to be initiated. He might possibly have included teachers needed by four-year collegiate and the proprietary schools, however, this seems unlikely because of the nature of the prefacing statements and questions prior to his making the estimate.

The need for these teachers can be examined by still another approach. Data from Input A--(established programs) reveal that in established programs, the number of full-time equivalent instructors in data processing is 3.24. Obviously, a number of variables are at work: size of the program, length of existence, aggressiveness of administrators and staff in promoting the program, depth of experience of the staff, facilities, and community or other external influences. If a conservative 2.5 teachers per program is adopted and is applied to programs which have been approved and are in the initiatory stages, an estimated need can be computed.

Twenty-three state directors anticipate approving and initiating new programs in 1968 and 25 directors anticipate approving new programs in 1969. Those which have been approved and will begin in 1967 as well as the expectations of the directors for 1968 and 1969 is shown in Table 43 on the following page.

TABLE 43

DATA PROCESSING PROGRAMS APPROVED AND EXPECTED TO BE APPROVED BY STATE DIRECTORS FOR VOCATIONAL EDUCATION

	Approved	Expect to be Approved		
	1967	1968	1969	Total
High School	38	32	41	111
2-Yr. Post-Second	64	62	57	183
. Totals	102	94	98	294

Because administrators of 102 new programs in 1967 will likely begin with the first-year courses only, it would seem possible to say that he will begin with only half of his anticipated staff. Experience of several schools suggest, however, that another person at least part time needs to be preparing himself to teach in the second-year program, work on curriculum development, ensure that equipment acquisitions and installations and a myriad of other details are handled. Applying the estimate of 2.5 teachers per program, the number of teachers needed in these 102 new programs would amount to 255. If one could accept a 50% cut in the estimated need of 255, another conservative estimate of 127 would be obtained. When added to the previously established boundaries, the minimum need would be estimated at 477 and a maximum of 527, for 1967.

A picture of the needs for 1968 and 1969 can be constructed by using these same conservative estimates.

TABLE 44

ESTIMATE OF DATA PROCESSING TEACHERS NEEDED FOR 1968 AND 1969 IN PREPARATORY PROGRAMS

1968	
Teachers needed in 221 established programs due to turnover and growth* (1.8 x 221)	400
Teachers needed in 102 programs to begin second-year courses (one-half staff)	128
Teachers needed in 94 programs to begin first-year courses (2.5 x 94 x 1/2)	117
Estimated need for data processing teachers in 1968 in two-year preparatory programs	645

*Staff replacement for the 102 programs have not been computed or included.

1969

Teachers needed in 221 established programs due to replacement and growth (1.8 x 221)	400
Teachers needed in 102 established programs due to replacement and growth* (1.8 x 102)	184
Teachers needed in 94 programs beginning second-year courses (one-half staff)	117
Teachers needed in 98 programs beginning first-year courses (one-half staff)	122
Estimated need for teachers in 1969 in two-year preparatory programs	823

---

*Staff replacement for the 94 programs have not been computed or included.

Should one wish to speculate that only 70% of the 1968 and 1969 programs will actually be initiated, the shortage for these years could be reduced to 600 and 750 respectively.

There are several connotations which can be and apparently are applied to the term "data processing program." There are a number of adult education courses in data processing offered at night by high schools, 2-year post-secondary and 4-year collegiate schools. Some have a job entry skill development objective, some have a retraining objective, and some a brush-up type objective. Some apply the term all the way from a six-weeks course in card punching at night to a substantive MDTA project designed to train computer programmers.

The estimate of the need of data processing teachers which can be used with greatest confidence is 1.8 teachers per two-year preparatory reimbursable program. Another estimate of needs for these teachers which can be used with reasonable confidence is 2.5 teachers for each two-year preparatory reimbursable program approved.

The preceding analysis has been limited to two-year reimbursable preparatory type of programs. While senior institutions and proprietary schools employ and need data processing teachers, the data collected from a study of those institutions, could not be analyzed and interpreted with confidence. The responses to four questions asked of most reference groups, including the participants, gives apparent credibility to the estimated shortages. These questions were:

> Did you start the present school term with an inadequate number of instructors in the specialized courses?

> Have you accepted teachers of the specialized courses in data processing who had less qualifications than you usually require?
>
> Is your school experiencing difficulty in locating qualified staff members to teach specialized courses in data processing?
>
> Is your school experiencing difficulty in hiring qualified staff members to teach specialized courses in data processing?

It is recognized that there is always a shortage of "well-qualified" teachers and therefore any inferences or conclusions must be drawn or used with caution. In view of the above statement, the findings are reported only. Approximately 48% of the respondents replied yes to each of the above questions.

STAFF CHARACTERISTICS

Data for describing the staff characteristics below were taken from Input A (established 2-year preparatory reimbursable data processing programs).

1. Nature of Employment:

   a. All staff members included in this study teach in two-year preparatory reimbursable data processing programs which have been in existance from 1 to 8 years (mean = 4.04 years).

   b. Full-time equivalent data processing teachers in the programs varies from 1 to 8 (mean = 3.24)

   c. Of the 27 systems studied, 18 (67%) are Business Data Processing programs; 2 are Scientific Data Processing programs; and 7 (26%) are combination programs.

   d. Staff replacement and expansion requires a mean of 1.8 teachers a year per program.

2. Education and Work Experience:

   a. In 16 institutions (59.3%), all data processing teachers have a degree.

   b. Work experience on a job is a prerequisite for employment in 20 systems (74.1%).

   c. Nine schools have staff members who attended one of the data processing summer institutes.

3. Salaries:

   a. Average annual salary paid data processing teachers in these programs is $8,552. (Range: $6,200-$12,000).

   b. Data processing teachers in 82% of the schools receive the same salary as others in their school. In 18% of the schools data processing teachers are paid a mean of $1,025 per year more than other teachers in their schools having comparable skill and ability.

4. Work Load:

   a. Contact hours of data processing teachers in 78% of the schools are the same as other teachers; in 8%, higher; in 14%, lower.

b. Credit hours of data processing teachers in 67% of the schools are the same; in 15%, higher; in 18%, lower.

c. In 40.7% of the schools data processing teachers assist with or handle completely the processing of school administration data as a part of their regularly scheduled work load.

5. Keeping Abreast of Technological Development:

    a. Twelve schools (44.4%) pays in excess of 80% of the expenses incurred by data processing teachers to attend meetings, conventions, to take equipment manufacturers' classes or home-study courses.

    b. One school pays 1/3 of the expenses of its staff to attend summer school while taking data processing related courses.

    c. One school financially assists its teachers as they obtain work experience on a job.

DATA PROCESSING TEACHER PREPARATION

Preparation of data processing teachers in business teacher training institutions as determined from the data reported on Input D (teacher training institutions) is virtually nil. Responses to selected questions are analyzed and reported below in support of the above statement.

Availability of Equipment: Seventy-one percent (17) of the respondents reported that there was a computer on their campuses. That the 24 institutions which answered and returned the questionnaire are representative of the population is not certain. College Management Magazine (1967) reported that over half of the colleges in the U. S. have no computer usage at all. The editors further reported that only 31% of the nation's colleges have a computer on their campuses. The population base used by the magazine included two-year colleges whereas the base used in this study did not. Whether or not the different population bases would account for the difference in percentages obtained is not known.

Nine of the seventeen schools having computers follow what is described as an open-door policy of computer usage and has been further defined as follows: Students may use the computer if enrolled in a course requiring it--hands-on time is provided. These nine schools represent 37.5% of the twenty-four under study or 52.9% of those having a computer. Five institutions follow a modified open-door policy in which only students who are engaged in research-type problems may use the computer. Under this policy students wishing to study the subject matter field with an objective of teaching computer programming in a technical education program may never have a hands-on experience unless he is engaged in solving a research problem. This does not appear likely unless the student is doing graduate work or is serving as a research assistant. Three schools follow a closed-door policy: one in which the computer is unavailable for student usage for any purpose, and two in which a student may have his computer programs ran by a member of the computing center staff.

Two plausible reasons for the lack of time on the hardware are given. Computers are typically used to process institutional business administration data and they are used extensively for research purposes, particularly in the universities. Other possible reasons are: some computer centers are open only during the day; some computer centers process data for firms or other organizations which are not related to the school system; in some institutions the development of data processing programs have been in Computer Science and do not recognize the need for a program in business data processing; and growing student populations prohibit hands-on time.

Good research studies have not yet indicated the necessity of hands-on time, the amount of hands-on time if deemed necessary, or the transfer of learning from one computer system to another.

Course Offerings: Four of the institutions which have a computer and follow an open-door policy (students may have hands-on experience) do not offer a single course in business data processing for prospective teachers or business majors. In contrast, two schools which do not have a computer offer courses: one offers two and one offers three. Additionally, two other colleges having computers and following a closed-shop policy offer one course each to business students.

Rather than to ask respondents whether or not they were preparing business data processing teachers, a decision was made to inquire of course offerings on a then-and-now basis. In this manner, it was hoped that some of the impact of the institutes and increased computer usage could be seen. Respondents were asked to list those courses which were offered on their campuses prior to the 1963-64 academic year, whether or not any of the courses were required of business education majors, and which department was responsible for course content, staffing, and student advising. The number of courses offered by the 24 respondents is given in Table 45.

Table 45

Course Offerings Prior to 1963-1964
in Business Teacher Training Institutions

	No. of Schools	Courses Offered	Total Courses	Percent Of Total
	15	0	0	0.0
	5	1	5	31.2
	2	2	4	25.0
	1	3	3	18.8
	1	4	4	25.0
Totals	24		16	100.0

As indicated in the table above, fifteen of the systems did not offer a course. In only two was a course offered above a beginning or introductory level--one in which the engineering department was responsible for the content, and staffing; and one in which the accounting department was responsible for content, staffing, and advising. Thus, from the data one can conclude that in none of the schools studied was a teacher education program for data processing. Approximately 17% of the schools offered 69% of the courses prior to 1963-64.

Table 46 presented below shows the number of courses offered by these same institutions at present (1966-67).

TABLE 46

COURSE OFFERINGS AT PRESENT IN BUSINESS TEACHER TRAINING INSTITUTIONS

No. of Schools	Courses Offered	Total Courses	Percent of Total
8	0	0	0.0
3	1	3	6.8
7	2	14	31.8
3	3	9	20.5
2	4	8	18.2
1	10	10	22.7
Total 24	--	44	100.0

One-third of the schools still do not offer courses in data processing. The remainder offers a mean of .6 courses each. Some interesting facts become evident from a tracing of individual schools through the period of time. Two examples are given: Five schools offered one course prior to 1963-64; three of these had not expanded their offerings by 1966; one had dropped its course, and one had added two courses. Another one of the schools which did not offer a course during the base year now offers ten.

From the data shown in Table 46, it can be determined that six schools (25%) offer 61% of the courses.

In the three-year period, the number of schools offering courses increased from 9 to 16 (77% increase) and the number of courses offered increased from 16 to 44 (175% increase). While the rates of growth in both schools and offerings is gratifying, one other fact must be presented. Only three schools at present are offering courses above the introductory level and in only one does the courses appear to be of substantive depth for teacher preparation. Obviously, a judgment has been made and an error could be easily committed as course titles in themselves do not reveal a whole story. The likelihood of committing such an error is not great when course titles such as "Introduction to Data Processing," "Key Punch," and "Office Automation" are listed. Care has been exercised also in deducting the content from course titles such as "Introduction to Computers," "Computer Theory," and "Introduction to Programming." When it can be determined that there was not a computer on the campus in which these courses were offered, or the computing center was following a closed-shop policy, then the chance of error seemed to be quite small. When other courses were listed, the titles of which conveyed an advanced type course, and there are only one or two courses offered then it does not appear that sufficient depth for teacher training is evident.

From the discussion above, it appears that a sizable number of colleges and universities have not recognized or have not (for some reason) accepted a responsibility for preparing business data processing teachers. Is it not an indictment of the nation's educational system that only one of twenty-four institutions of higher learning has developed a teacher training program in such a dynamic field?

Additional supportive evidence of the lack of teacher education programs is shown in representative comments of state directors (Input E) in the appendices.

PROBLEMS ASSOCIATED WITH DATA PROCESSING PROGRAMS

It is doubtful if any educational program is without its problems. It seems, however, that the problems associated with data processing education is not generally known or understood. In the discussion which follows is an enumeration of problems characteristic of these programs.

Lack of Qualified Staff: Staff as used in this discussion refers particularly to those in two-year vocational preparatory programs and includes administrators and instructors of specialized courses. As pointed out in the analysis of needs for data processing teachers, virtually all reference groups felt this problem to be one of considerable concern. Whether a program is being initiated or maintained, this problem was ranked with equal importance to financing a computer installation by respondents (Input A and B). In many schools it is easier to purchase or lease a full complement of data processing hardware than it is to locate and employ a qualified staff member.

What the specific teacher qualifications should be is subject to interpretation and immediately calls for a clarification of program objectives. For vocational preparatory programs, the various state plans generally do specify a technical competency, formal education, and work experience of one to three years. To this, many post-secondary colleges specify a minimum of a bachelor's degree and teaching experience. While most senior colleges do not have a two-year preparatory data processing program, the problem of qualified staff in these institutions is compounded by a requirement for an advanced degree.

This problem is important, not only because there is a current shortage of qualified teachers, a lack of teacher preparation, and a difficulty of determining qualifications, but also because of the rapid obsolescense of knowledges and skills of teachers which takes place. Upgrading the lesser trained and helping the better-trained and more knowledgeable data processing teacher is a problem of some magnitude. This element of the total problem is two-headed: keeping abreast of technological advances being made in hardware configurations, and keeping up-to-date with a constant improvement in software packaging. To some extent, teachers become technologically obsolete when each new generation computer is marketed. Many of the participants (124) who were trained in the institutes have already found it either necessary or desirable to retrain. Newer computers, unavailable at the time the institutes were offered, have made their appearance. In excess of 50% of the aminitrators of data processing programs have recognized this problem by assisting teachers financially for upgrading purposes.

Financing Data Processing Programs: Providing for quality educational programs has always been a concern to governments and school administrators. Providing for quality two-year preparatory programs in data processing is probably more expensive on a per student basis than any other program. While it seems many recognize that these programs are expensive to initiate, not all seem to be cognizant of the cost of maintaining such programs. The acquisition cost of equipment is only a part of the problem. For some institutions, the cost of acquiring the equipment is minimal when compared to others in which the cost must broadly include extensive remodeling or the construction of a new facility to house the installation. Should an objective of processing institutional business administration data be one of those used to justify the purchase of the equipment, administrators often find to their dismay that conversion cost of records is considerably more than previously envisioned. In order to reduce the cost of such programs an alternative seems to be one of finding one or more individuals who can manage the installation, write computer programs for institutional processing, and meet credentialing requirements to teach specialized courses. Should such supermen be obtained, it is often at salaries equal to those of first-line administrators.

A second element of the problem is the financing of equipment additions and replacements. It appears that many data processing programs are initiated with minimal equipment and with a lack of necessary preplanning. School administrators along with business executives have been bitten by the status bug with respect to the computer, resulting in questionable motives for a sound educational program. Once initial pieces of equipment have been installed, a realization may be made that the configuration will not produce the desired output or debilitates the accomplishment of hoped for objectives. While the attention of governmental agencies is turning from the financing of one program to the possibility of financing another, a proposal for equipment additions is presented from one supposedly financed. Should equipment manufacturers be in the process of bringing out a newer and perhaps more powerful system, the proposal may be for replacement rather than for additional components for an existing computer or unit record system.

Determining Curriculum: A third broad problem is related to curriculum development in data processing. Suggested curriculum guides which have been developed by various states and the one published by the U. S. Office of Education have been used to good advantage, however, this problem was ranked as the third most serious by two of the reference groups (Input A and B) and was a matter of concern for all groups studied.

The problem is compounded by a number of variables: program objectives, motives for offering programs, qualification of teachers, financing, the historical background of automated data processing, technological developments in both hardware and software, and the lack of good research studies in a relative new and highly dynamic field. Many of these factors have been discussed already, however, they are so intertwined that it is difficult to perceive a very clear picture. Additional comments follow as supportive information for some of the factors.

It appears necessary for educational leaders to develop a clear and concise statement of objectives for data processing programs. It is one thing to train computer programmers; it is quite another to train key punch operators, and still another to offer a descriptive orientation to data processing to all students having a desire to benefit from such training. While each may be generally described as a data processing course, each require different objectives, different amounts of financing, different qualifications of teachers, and different techniques of administration.

Should an institution be motivated to lease or purchase automated data processing equipment to process the mountains of institutional paperwork and then in order to acquire funding agrees to offer an educational training program, the first motive appears to remain paramount. In some instances, the development of curriculums, the search for qualified teachers, and [illegible] seeking of additional funds begins with the agreement to offer training in data processing. Whether or not such a practice should be praised or condemned would be conjecture. In any event the preparation and preplanning for an educational program comes as an afterthought and in many cases students are fitted into processing schedules rather than institutional processing be fitted into the educational program.

The historical background of automated data processing and early computer applications have suggested to business educators and business executives that the programmer today must have a major in mathematics or engineering. Terms such as binary arithmetic, magnetic tape, nanoseconds, index registers, and Cobol as used by the practitioner are elements of a foreign language to many people. Rather than to become involved in learning this new language to teach in a field which is filled with frustrations and packed with problems, many educators have preferred to remain in the more comfortable and secure nest on the ground. Should business educators desire to retrain to teach in such programs, they have difficulty in locating institutions of higher learning which offer substantive teacher training programs. In many cases they must pay their own expenses. Should they retrain in equipment manufacturer's schools they may do so at their own expense and then fail to receive consideration for increased salaries because the training was 'unacceptable' or nonaccredited.

Another aspect of the curriculum problem is that of defining types of training for jobs in industry. As it is true in most occupational fields, job titles, descriptions, and duties are subject to rather liberal interpretations. In one firm a programmer may be a technician; in another, a professional. In one firm he does essentially coding; in another, he performs systems work. In one he belongs to the "EDP" department; in another, to the "Systems" department.

Closely allied to the elements of this broad problem is one of determining the level at which data processing should be taught. To those who contend that these programs should be placed at the high school and post-secondary school level, others would counter with the argument that many firms needing programmers insist upon an individual with a degree. Two of the respondents representing teacher training institutions do not feel that data processing courses should be taught at the high school level at all; another felt that if any were taught, the courses should include only training on the key punch and sorter. Three of the state directors did not feel that businesses would hire high school graduates of data processing programs. Few institutions of higher education have recognized and accepted a responsibility of preparing programmers or systems analysts.

Not only is there a problem of determining the level at which these programs should be offered, but there is one of determining the courses or educational experiences which should be provided for graduates of one level who wishes to continue his studies at the next higher level. A progression of similar experiences has been defined for years in such subjects as mathematics, bookkeeping, etc. Obviously, educational programs in automated data processing have not been in existence nearly so long.

One final element of the total curriculum problem to be discussed is related to teaching and learning materials. Part of this problem is inseparable from other elements discussed above. It seems to stem to some extent from an indecision of what should be taught, to whom, when, and in what depth. Improvement in quality over the past few years of these materials is generally recognized, however, this problem was ranked as the fourth most serious by respondents (Input A and B). Technological advances and the relative newness of the field are apparently contributors to the problem also. Many of the publishing companies' efforts in business data processing apparently are still too technical and in tradition follow too closely to scientific data processing.

Additional supportive evidence of the problems associated with data processing programs are shown in representative comments of state directors (Input E) in the appendices.

SECTION IV

SUMMARY AND RECOMMENDATIONS

Summary: Five data processing summer institutes for business teachers were conducted for three years beginning in 1963. The primary purpose was to assist participants in developing the knowledge and skills essential for teaching specialized courses in a two-year vocational preparatory curriculum in business data processing. A first-year program was conducted in 1963, 1964, and 1965. A second year program was conducted for participants who successfully completed the first during the latter two years.

Financing the institutes was accomplished through a cooperative arrangement between the U. S. Office of Education, state departments of education in which the institutes were located, and the institutions in which the training was offered. Receiving institute training in the first year program were 347 business teachers, mathematics teachers, other subject matter teachers, counselors, registrars, and department heads; and in the second year, 103. Seventy-six percent of the participants were male.

The institutes were eight weeks in length and were conducted at the following institutions during the three-year period: Orange Coast College, Costa Mesa, California; Colorado State University, Fort Collins, Colorado; Miami-Dade Junior College, Miami, Florida; and the Milwaukee Institute of Technology, Milwaukee, Wisconsin. An institute was conducted in North Carolina at the following locations: Central Industrial Education Center, Charlotte (1963); Asheville Industrial Education Center, Asheville (first year program only, 1964); Burlington Industrial Education Center, Burlington (Second year program only, 1964); and Holding Technical Institute, Raleigh (both programs, 1965). Each institute represented a geographical region from which the participants came. Thirty-five states, the Virgin Islands, and Puerto Rico were represented by participants.

The curriculum provided for approximately three and one-half hours of lectures and discussion and about three and one-half hours of laboratory practice. Additionally, it provided for invited guest lectures and visits to computer installations.

Participants in the first-year program studied and learned to use electro-mechanical (Unit Record) data processing machines such as: card punches, verifiers, reproducers, interpreters, collators, and tabulators. They also studied computer components and computer programming. Application of these learnings were made by writing computer programs and processing data with them on computer systems.

The equipment (both unit record and computer) was ample with respect to amounts and kinds. It was representative of that being used in industry and in back-home teaching stations at that time.

Participants in the second-year program studied advanced computer programming, programming systems, and business information systems. Equipment time was made available to participants for application purposes. Principles of Vocational Education were studied formally or informally during the latter two years in most institutes.

The participants were a homogeneous group in terms of prior course work, work experience, and aspiration. With few exceptions, those selected to participate were persons who had a degree in business education or business administration, were employed as a teacher, were available for a teaching assignment in preparatory programs as a business data processing teacher, and who, upon completion of the institute could qualify for credentialing under their home state plans for vocational education.

There was considerable enthusiasm for learning data processing and a concomitant desire for retraining. For many, it was a long hot summer filled with equally long days and nights as the participants attempted to learn and at the same time prepare lesson plans to teach what they had been studying.

Several returned home from the institute to teach with equipment both similar and dissimilar to that which they had studied. For others, there was no equipment that year, perhaps there would be none for two or three years, perhaps never. Despite the hard work, studying and learning anew language, getting acquainted with new and strange pieces of equipment, and preparing to embark into a new area of teaching, the participants were, for the most part, highly complimentary of the institute project. Too, they were appreciative of the opportunity to break in on a new field at the ground level.

Approximately 70% of the participants received financial assistance from their home state or home districts during 1963 and 1964. The remainder paid their own expenses. Built into the institute budgets for 1965 were travel and cost of living allowances.

Returns of a questionnaire from 251 participants reveal that 70% have taught one or more specialized courses since attending an institute. Thirty percent have not taught any of the specialized courses. The only finding of any significance to explain this phenomena was that 60% of those who are still associated with a school system was associated with one which did not offer a concentration of study in data processing. Factors such as age, prior work experience, prior educational experience, sex, degrees, whether receiving subsistence or not while attending an institute were tested and found not to be significantly related to whether or not participants persists as data processing teachers.

The three-way analysis of variance technique was to be used to analyze the strengths and weaknesses of the institutes as perceived by the participants. Principal strengths were the facilities used, the participants' interest in and their acquisitions of knowledges and materials to teach data processing courses, and the course offerings. Weaknesses identified by the participants were the helpfulness of the institute in giving them confidence to organize a data processing curriculum and to teach specialized courses, methods of instruction as it pertained to the speed at which the material was presented, and an inadequate amount of time on the computers during laboratory periods.

A fifth objective of the study was to attempt to determine to what extent there was a potential or actual shortage of data processing teachers. Implications of this objective led to a search of revelant side effects.

Data were gathered from five reference groups: post-secondary two-year schools having an established program in data processing, post-secondary two-year schools in which it was not known to have a preparatory data processing program, proprietary schools, business teacher education institutions, and state directors for vocational data processing programs. The findings are given below in terms of needs for data processing teachers, staffing characteristics, data processing teacher education, and problems associated with data processing programs.

There is a need for 1.8 teachers for each established two-year reimbursable preparatory program in business data processing for 1967, 1968, and 1969. This estimate includes turnover and program growth. Considering that 221 programs are in existence at present and that 102 programs will be initiated during 1967, there is a conservative need of from 475 to 525 teachers. The outlook for 1968 appears to be approximately 600, and 750 for 1969.

The above figures are estimates of those needed in two-year preparatory programs and do not include those needed by proprietary programs or four-year collegiate schools. It appears that competition for the data processing teacher will become more intense than it has been. There is some evidence that administrators have begun to pay data processing teachers higher salaries than others who have comparable ability and experience.

Data gathered from post secondary two-year vocational preparatory programs reveal that these programs have been in operation for 4 years. On the average, there are 3 full time instructors per program. Sixty percent of the instructors have degrees; 74% are required to have had work experience in data processing. Annual salaries paid data processing teachers range from $6,000 to $12,000. In 82% of the schools they receive the same salary as others having comparable ability and experience; 18% data processing teachers receive a higher salary than others. Work load as expressed by contact and credit hours is the same for data processing teachers as others in most schools. In 41% of the schools, they assist with or handle completely the processing of institutional data.

Four-year colleges and universities in which business education teachers are prepared have not developed programs to train teachers for vocational preparatory programs at the undergraduate or graduate level. A considerable increase in course offerings in business data processing has taken place during the past three years in these institutions. Most of the courses, however, are of a descriptive or introductory type in which a hands-off-equipment approach is taken. One-third of the institutions studied do not offer a course in business data processing. While most (71%) of the senior institutions studied have computers, only one-half of those which have an installation follow an open-door policy which permits students to have an on-hands experience with the equipment.

The most pressing problems associated with a data processing program are (1) lack of qualified staff and keeping present staff updated, (2) financing equipment and maintaining an updated configuration, and (3) determining the curriculum with respect to objectives, motives, courses, scheduling of lecture and laboratories, and suitable teaching and learning materials. Student selection for these programs appears to be a more difficult problem than student placement.

Recommendations: In view of the findings presented in this report, a number of recommendations follow. Some of these are specific, some general, some contingent.

1. It is recommended that the institute project be reactivated under the sponsorship and cooperative financing of the federal government.

Selection of institutions: The selection of a training facility should be made of the basis of its having the following: (1) a third generation computer system which will be made available to participants for approximately three hours daily for each program level being offered, (2) staff members who have had work experience as automated data processors on equipment similar and related to the type used in courses they teach; and teaching experience in data processing courses, and (3) a director and staff who are willing and have a desire to teach teachers for vocational preparatory programs. Whether or not the institution is in close proximity to the participants' homes does not appear to be justifiable criteria. If a participant must relocate for a summer, it probably makes little difference whether the distance traveled is 500 or 2,000 miles.

Participant Selection: Criteria used to select participants for 1965 appears to have been satisfactory and should be retained. Suggestions for improving selection criteria follow. Those selected to participate should hold a position in an institution which has a two-year preparatory data processing program or in a system which expects to initiate such a program in the fall following the institute training. It is the opinion of the author that those participants who have strong business administration backgrounds or extensive work experience in a firm have less difficulty learning computer programming and business systems.

Institute Curriculum: It is recommended that not more than three formal courses be developed and offered at each program level (first- and second-year programs). Too many courses prohibit or limit the amount of laboratory time and apparently was a contributor to the participants' feeling that too much was attempted too fast. It is suggested that less emphasis be placed upon the learning and application of unit record equipment and more be placed upon a study of computers and computer programming. Pedagogy should receive more attention. Invited guest lectures and visits to computer installations should be continued. Budgets should allow for rather liberal pass-out materials which would be of benefit to teachers after leaving the institute. The institute length should be eight weeks; approximate class size should be 25 members.

Third-year Program: Many present data processing teachers should have an opportunity to update and upgrade themselves. Four to six-week programs or separate institutes should be established in order to give teachers advanced knowledges and skills. Many need to broaden their backgrounds to include such topics as multi-processing, teleprocessing and data collection systems, and information retreival.

Travel Allowances and Stipends: Teachers who are willing to be retrained to teach data processing are unique. It appears that reimbursement of educational expenses of participants should help to attract the more capable individuals.

Evaluation and Planning Conferences: To the directors and instructors, the evaluation conference and the planning conferences held in the fall of 1963 and the spring of 1964 were the most effective. When they were combined, there was not enough time for both functions. It is recommended that an instructor workshop be held at the planning conference prior to institute training.

2. It is recommended that consideration be given to assisting senior institutions in the development of teacher education programs in data processing.

Institutes for Collegiate Business Teachers: To overcome the need for crash programs such as the institutes, it appears that assistance must be given to the four-year colleges and universities in their developmental efforts of establishing data processing teacher education programs. The objectives envisioned for an institute for the collegiate business teacher would include (1) to stimulate the development of programs; (2) to assist in the development of knowledge and skill essential for teaching specialized courses in collegiate business data processing teacher education curriculums; and (3) to stimulate research studies in data processing education.

Financial Assistance for Acquisition of Automated Date Processing Equipment for Teacher Education Programs: It is doubtful that teacher education programs in business data processing will be initiated until equipment becomes available for those programs. The university computing center with its closed-shop policy, in terms of this discussion, is analogous to the chemistry class without test tubes, bunsen burners, and other equipment.

3. It is recommended that in the event either of the suggestions for institutes are implemented, an appropriate evaluation be conducted concurrently with the institutes.

4. It is recommended that in the event either of the suggestions for institutes are implemented, institute proposals and budgets be approved as early as possible but no later than by February 1 of the year of training. Preplanning by institute directors, instructors, state directors, participants, and administrators of participants can be enhanced by an early approval date.

5, It is recommended that the Electronic Data Processing--I curriculum guide (OE-80024) be revised. This guide was printed in 1963. Significant developments have been made in data processing hardware and software since that date.

6. It is recommended that appropriate state officials make a critical study of the needs for business data processing preparatory programs. The approval and establishment of these programs should be done after a careful consideration of the many problems peculiar to these programs. In view of the shortage of qualified teachers, the financing of initial and subsequent purchases of equipment, it is doubtful that high-quality programs can be maintained.

APPENDIX I

SUMMER INSTITUTES--1965

APPLICATION FOR PARTICIPATION IN BUSINESS DATA PROCESSING TEACHER EDUCATION INSTITUTE

☐ 1st YEAR PROGRAM ☐ 2nd YEAR PROGRAM

THE INSTITUTES REPRESENT THE COOPERATIVE EFFORTS OF PARTICIPATING INSTITUTIONS, STATE BOARDS FOR VOCATIONAL EDUCATION AND THE U.S. OFFICE OF EDUCATION.

INSTITUTION TO WHICH APPLICATION IS MADE ______________________________

NAME OF INSTITUTE DIRECTOR ______________________________

THIS FORM WITH EVERY ITEM FILLED IN, INCLUDING THE SIGNATURE OF THE STATE DIRECTOR OF VOCATIONAL EDUCATION, MUST BE SENT IN DUPLICATE TO THE DIRECTOR OF THE APPROPRIATE SUMMER INSTITUTE. APPLICATIONS WILL BE PROCESSED AS RECEIVED.

SUPPLY A COMPLETE ANSWER TO EACH ITEM WRITING "NONE" WHERE APPROPRIATE. USE AN EXTRA SHEET WHENEVER NECESSARY, BUT NOT UNLESS NECESSARY. TYPE OR PRINT RESPONSES.

1. NAME
MR. MRS. MISS ______________________________ 2. ______________________________
(ENCIRCLE ONE) LAST FIRST MIDDLE SOCIAL SECURITY NUMBER

3. NAME OF SCHOOL IN WHICH YOU TEACH ______________________________

SCHOOL ADDRESS ______________________________
NUMBER & STREET CITY ZONE STATE

YOUR POSITION ______________________________ TYPE OF SCHOOL: ____COLLEGE ____JUNIOR COLLEGE
____OTHER ____HIGH SCHOOL

4. NAME AND LOCATION OF SCHOOL IN WHICH YOU EXPECT TO TEACH BUSINESS DATA PROCESSING

____

5. RESIDENTIAL ADDRESS ______________________________
NUMBER & STREET CITY ZONE STATE

6. CHECK MAILING ADDRESS YOU WISH USED: SCHOOL (ITEM 3) ______ RESIDENTIAL (ITEM 5) ______

7. SINGLE ______ MARRIED ______ NUMBER OF CHILDREN ______ 8. DATE OF BIRTH ______________

9. EMPLOYMENT RECORD. LIST EXPERIENCE IN BUSINESS, INDUSTRY AND GOVERNMENT. (LIST IN REVERSE CHRONOLOGICAL ORDER GIVING MOST RECENT EXPERIENCE FIRST.) (ADD SEPARATE SHEET IF NECESSARY.)

DATES	EMPLOYER	NATURE OF ACTIVITY

10. EMPLOYMENT RECORD -- PROFESSIONAL. LIST PROFESSIONAL EXPERIENCE IN TEACHING AND WORK RELATED TO TEACHING. (LIST IN REVERSE CHRONOLOGICAL ORDER GIVING PRESENT OR LAST POSITION FIRST.) (ADD SEPARATE SHEET IF NECESSARY.)

DATES	EMPLOYER	NATURE OF ACTIVITY

11. CHECK YOUR TEACHING CERTIFICATION STATUS: PERMANENT OR FULL ACCREDITED ______ TEMPORARY OR EMERGENCY ______

VOCATIONAL ______ NO CERTIFICATE ______

12. TEACHING EXPERIENCE **(AS OF JUNE 30, 1965):**

SUBJECT	INSTITUTIONS AND YEARS									
	HIGH SCHOOL (ALSO JR. HIGH)			COLLEGE (ALSO JR. COLLEGE)			OTHER (SPECIFY)			TOTAL
	FROM	TO	YRS.	FROM	TO	YRS.	FROM	TO	YRS.	YRS.
ACCOUNTING										
AUDITING										
BANKING, INSURANCE, INVESTMENT										
BUSINESS ADMINISTRATION										
BUSINESS LAW										
MARKETING & MERCHANDISING										
ELECTRONIC DATA PROCESSING-- (SPECIFY)										

13. COLLEGE OR UNIVERSITY EDUCATION:

INSTITUTION	SCHOOL OR DEPARTMENT	FROM	TO	DEGREE	MAJOR	MINOR

14. HAVE YOU COMPLETED COURSES IN PHILOSOPHY AND/OR PRINCIPLES OF VOCATIONAL EDUCATION?

NO ______ YES ______ NUMBER OF SEMESTER HOURS ______

15. LIST ALL DATA PROCESSING PROGRAMS THAT YOU HAVE ATTENDED:

NAME OF INSTITUTION	TITLE OF COURSE	YEAR	DURATION	SPONSORED BY

16. DISCUSS YOUR PLANS FOR ELECTRONIC DATA PROCESSING TRAINING AND YOUR REASONS FOR WISHING TO PARTICIPATE IN THIS SPECIFIC INSTITUTE, SKETCHING BRIEFLY THE BENEFITS YOU HOPE TO DERIVE FROM SUCH PARTICIPATION AND THEIR RELATIONSHIPS TO ANY SPECIAL PROBLEMS YOU EXPECT TO FACE IN YOUR TEACHING SITUATION. (USE SEPARATE SHEET)

SIGNATURES:

______________________ APPLICANT ______ DATE

______________________ STATE DIRECTOR OF VOCATIONAL EDUCATION ______ DATE

APPROVED:

______________________ SUMMER INSTITUTE DIRECTOR INSTITUTION ______ DATE

APPENDIX II

STAFF EVALUATION

NAME: ____________________

ADDRESS: ____________________

PRIOR WORK EXPERIENCE IN DATA PROCESSING (INDUSTRY)

Unit Record ________ Months
Computer ________ Months

PRIOR EDUCATION EXPERIENCE IN DATA PROCESSING (COURSES TAKEN)

Unit Record ________ Months
Computer ________ Months

PRIOR TEACHING EXPERIENCE IN DATA PROCESSING

Unit Record ________ Months
Computer ________ Months

I. Objectives and Purposes

A. The purpose of the institute, as described in the 1965 brochure, was to assist in developing the knowledge and skill essential for teaching specialized courses in a two-year preparatory curriculum in business data processing.

1. To what extent do you feel this objective was accomplished in your institute?

_____ Accomplished extremely well
_____ Accomplished well
_____ ?
_____ Partially accomplished
_____ Not accomplished

II. General

Indicate your observation and judgment by checking each item in one column at the left. Items not applicable or not subject to your observation should be omitted. Be frank.

A. Environmental conditions

Commendable	Satisfactory	Unsatisfactory	
___	___	___	1. Classroom spaces
___	___	___	2. Work spaces
___	___	___	3. Quarters of participants
___	___	___	4. Teaching equipment, aids (chalk boards, overhead projectors, etc.)
___	___	___	5. Resource material, library
___	___	___	6. Eating facilities

Commendable	Satisfactory	Unsatisfactory	
			B. Participants
___	___	___	1. Appropriateness of academic backgrounds
___	___	___	2. Willingness to work
___	___	___	3. Intellectual curiosity
___	___	___	4. Concern for applicability of techniques
___	___	___	5. Aspiration
			C. Organization
___	___	___	1. Adequacy of notice to prospective applicants
___	___	___	2. Sufficiency of preplanning
___	___	___	3. Smoothness of operation
___	___	___	4. Adaptability to obstacles and feedback
___	___	___	5. Sensitivity to grievances
___	___	___	6. Adequacy of financial support of program
			D. Schedule
___	___	___	1. Appropriateness of 8 weeks for the institute
___	___	___	2. Time spent efficiently
___	___	___	3. Events sequenced appropriately
___	___	___	4. Punctuality
___	___	___	5. Balance between formal, informal affairs
___	___	___	6. Quantity of discussions
___	___	___	7. Quality of discussions
___	___	___	*8. Quality of formal presentations*
___	___	___	9. Methods of evaluation
			E. Outcomes
___	___	___	1. Intended content was actually taught
___	___	___	2. Increase in participant understanding
___	___	___	3. Improvement in attitude toward Business Data Processing and Electronic data processing
___	___	___	4. Personal associations initiated

F. Would you please indicate the proportion of your lecture period that was spent in showing teachers how to teach data processing courses (Pedagogy)?

1. _____ 0%
2. _____ 10%
3. _____ 20%
4. _____ 30%
5. _____ 40%

III. Selection of Participants

A.

1. Were you satisfied with the group of "student" participants selected?

   ______ yes ______ no

   How could the selection have been improved?

2. Did you perceive the participants to be reasonably well satisfied with the institute experience?

   ______ yes ______ no

3. In your opinion did you feel the participants' education and background in general was adequate?

   ______ yes ______ no

IV. Facilities

A. Data Processing Equipment

1. Do you feel that the number of pieces of data processing equipment used in your institute program was adequate?

   ______ yes ______ no

   Comment:

2. Do you feel that the kinds of data processing equipment used in your institute program was adequate?

   ______ yes ______ no Comment:

3. In the chart below, would you please indicate the amount of "Hands-on" time allotted for each participant. Please express the time in hours.

	First-Year Program			Second-Year Program	
	1963	1964	1965	1964	1965
EAM Equipment	____	____	____	____	____
Computer Equipment	____	____	____	____	____

4. To what extent do you feel that the data processing equipment used in your institute was available for participant usage?

   ______ Extremely adequate
   ______ Adequate
   ______ ?
   ______ Adequate at times
   ______ Not adequate
   Comment:

5. Were additional amounts of hands-on time (other than the above) provided for participants?

______ yes ______ no Comment:

B. Teaching Supplies and Aids

6. Would you please give an inventory of textbooks, reference materials, and specialized supplies used in your institute by program level and by year.

		First-Year Program Books Used	
Course	1963	1964	1965
		Second-Year Program Books Used	
		1964	1965

7. Did you utilize Programmed Instruction materials in the specialized courses of the first-year program?

8. Did you utilize Programmed Instruction materials in the specialized courses of the second-year program?

9. If yes to 8 or 9, describe your reaction as to suitability - frequency-participant reaction.

10. Did you use some type of teaching machines in teaching the specialized courses? ______ yes ______ no. If yes, comment on suitability.

11. To what extent did you find the use of the overhead projector slides, film strips, and films as beneficial teaching aids in the institute courses?

______ Extremely beneficial
______ Beneficial
______ ?
______ Somewhat beneficial
______ Not beneficial
Comment:

12. To what extent do you feel you may have encountered difficulty in locating suitable textbooks and reference materials for the specialized courses of your institute classes?

______ Much difficulty
______ Difficult
______ ?
______ Some difficulty
______ No difficulty
Comment:

13. To what extent do you feel that the textbooks and reference materials used in the specialized courses of your institute program were helpful in the accomplishment of the objective?

	First-Year Program			Second-Year Program	
	1963	1964	1965	1964	1965
Extremely helpful					
Helpful					
?					
Some help					
Not helpful					

Comment: (Specify program level and year)

14. Would you please describe any outstanding teaching technique developed in your institute.

15. Would you please describe any outstanding material developed in your institute.

V. Organization

A.

1. Did you feel that the institute met the needs of the participants?

______ yes ______ no

2. Were you satisfied with the curriculum of the institute?

______ yes ______ no

3. What would you change in the curriculum?

4. Did you gain any new ideas from the evaluation conferences?

______ yes ______ no

Did you incorporate these ideas in your teaching of the institute?

______ yes ______ no

5. To what extent do you feel that the institute program, as conducted, is an effective means of training teachers to teach data processing courses?

______ Extremely effective
______ Effective
______ ?
______ Somewhat effective
______ Not effective
Comment:

6. Do you feel that there is a need for continuing the institutes? ______ yes ______ no Comment:

7. Did you feel that the field trips were beneficial?
______ yes ______ no

8. In the space provided would you please rank the type of program you believe to be most effective for training teachers for specialized courses in data processing. Place a "1" in the blank to indicate the one you feel to be most effective.

______ Summer institutes
______ Undergraduate programs
______ Graduate programs
______ Equipment manufacturer's schools/short courses
______ Private business or technical schools
Comment:

9. Were the objectives you set for yourself during the institute attained? ______ yes ______ no

10. Were you to do the same assignment over, in what major ways, if any, would you change your contribution?

11. In what ways, if any, did you as a staff member benefit personally as a result of your participation in the institute?

VI. Third-Year Program

1. To what extent do you feel that there is a need for a third-year program in the institute?

______ Strongly needed	______ Needed somewhat
______ Needed	______ Not needed
______ ?	Comment:

2. If a third-year program should be offered, would you briefly describe the content desired. Please list the content items in the order of their importance.

3. If a third-year program should be offered, what do you feel should be the length in number of weeks? ______ weeks

4. If a third-year program should be offered, would you please suggest criteria for participant eligibility.

APPENDIX III

BUSINESS DATA PROCESSING INSTITUTE EVALUATION

1. Name ______________________ Address ______________________

2. Which summer(s) did you attend? ____ 1963 ____ 1964 ____ 1965.

3. Did you receive a compensation from your home school system, home state, or some other source while attending the institute during 1963 or 1964? ____ Yes ____ No.

   If yes, and had you not received a compensation, would you have attended the institute anyway? ____ Yes ____ No.

4. Do you teach or are you currently associated with a school system? ____ Yes ____ No.

   If your answer above is No, would you please complete parts III and IV only. If your answer is Yes, would you please complete the first three parts only.

PART I

5. School Name ____________________ Address ______________________

6. Please classify your school by checking one of the following:

   ____ High School ____ Jr/Community College ____ Four year College/University _____ Other - Specify: ______________________

7. Does your school system offer a concentration of study in Business Data Processing? ____ Yes ____ No. If yes, what is the approximate enrollment in this area? ______

8. Would you please describe your main responsibilities in the year just prior to attending an institute? List courses taught, administrative duties, etc.

   ____

   ____

   ____

9. Please check those courses you have taught since attending the first institute and the year you have taught them.

	1963-64	1964-65	1965-66
Accounting and Auditing			
Banking, Insurance, Investments			
Business Law			
Marketing/Merchandising			
Electronic Data Processing (Computer Programming)			
Unit Record			
Statistics			
Accounting Machines (Other than Unit Record Equipment)			

10. Would you please indicate in the space below any college work you have taken since attending an institute.

Name of Institution	Department in which work was taken	Dates attended From	To	Receive a Degree? Yes	No

Were any of the courses taken above related to Data Processing?
____ Yes ____ No.

11. In the space below, would you please list all data processing programs that you have attended other than in a college or university since attending the institute.

Firm or Organization offering DP Program or Courses	Title or nature of program or courses taken	Length Please specify days, weeks, months	Year in which you attended-

12. Please check below the proportion of your total work load that you spend in processing data of a school administration nature.

________ 0- 9%
________ 10-19%
________ 20-29%
________ 30-39%
________ 40% and over

PART II

13. Do you now teach in a school system or are you now associated with a school system different from the one you were associated with prior to your attendance of the first-year BDP institute? ____ Yes ____ No.

If yes, could you attribute your change in schools to your attendance in an institute? ____ Yes ____ No.

14. Have you received a promotion in rank or have you been given an assignment which you would consider an advancement since attending the institute? ____ Yes ____ No.

15. Do you feel that you are better off financially as a result of attending an institute? ____ Yes ____ No.

16. Do teachers of specialized courses in data processing in your school receive a higher salary than others who have comparable ability and experience? ____ Yes ____ No.

17. Do teachers of specialized courses in data processing in your school carry a greater teaching load than other teachers? ____ Yes ____ No.

18. Do you feel that you now enjoy a greater status than you did before attending an institute? ____ Yes ____ No.

    If yes, could you attribute this greater status to attendance at the institute? ____ Yes ____ No.

19. Would you recommend the institute training, if offered, to one of your qualified colleagues? ____ Yes ____ No.

20. Do you feel there is a need for offering the institutes again? ____ Yes ____ No.

21. Do you feel there is a need for a third-year program in the institutes? ____ Yes ____ No.

22. Is your school system experiencing difficulty in locating qualified staff members to teach specialized courses in data processing? ____ Yes ____ No.

23. Is your school system experiencing difficulty in hiring qualified staff members to teach specialized courses in data processing? ____ Yes ____ No.

24. If in your present teaching, you need help with a technical problem in a data processing course, do you have a colleague on your staff to which you can turn for assistance? ____ Yes ____ No.

25. Do you participate in meetings which are designed primarily for the benefit of persons associated with data processing? ____ Yes ____ No.

26. Did you first learn about the summer institutes from your state director for vocational education or someone in the state department of education in your state? ____ Yes ____ No.

27. Did you feel that eight weeks was about right with respect to length for the institutes? ____ Yes ____ No.

28. Would you please comment on those courses that you felt were poorly taught or any other problems which you encountered.

PART III -

TO BE COMPLETED IF YOU ATTENDED THE FIRST-YEAR PROGRAM AT A SUMMER INSTITUTE.

Please check the appropriate space that best describes your opinion of the statements below using the following code.

SA	Strongly Agree
A	Agree
U	Undecided
D	Disagree
SD	Strongly Disagree

	SA	A	U	D	SD
1. The meeting rooms were of adequate size . . .					
2. The physical factors (color, light, accoustics) were satisfactory					
3. Ventilation of the rooms was satisfactory . .					
4. There was a noticeable lack of the use of visual aids					

	SA	A	U	D	SD
5. The amount of Unit Record Equipment was adequate					
6. The amount of Computer equipment was adequate					
7. The number of courses offered was adequate					
8. The methods of instruction had many shortcomings					
9. The subject matter was interesting					
10. I was enthusiastic about learning data processing					
11. The content of the courses was less than adequate					
12. The subject matter was too technical					
13. The number of instructors was adequate					
14. The number of lab assistants was adequate					
15. The instructors were highly qualified to teach the subject matter					
16. The instructors did a satisfactory job of teaching					
17. The instructors lectured to us as though we were freshmen					
18. For the most part, the instructors were well prepared for each lesson					
19. Not enough time was allowed to pursue activities of my own choosing					
20. There was not enough contact between teacher and participant					
21. The "hands-on" time in Unit Record labs was inadequate for me					
22. The "hands-on" time in Computer labs was inadequate for me					
23. Scheduling of classes and labs was well organized					
24. The subject matter was presented too fast					
25. The lectures were too long					
26. There were insufficient opportunities to associate with other participants					
27. I had hopes the institute would be better than it was					
28. The institute experience has been invaluable to me					
29. The lack of suitable textbooks was a deterrent in my learning					
30. There should have been more outside speakers brought into supplement learning activities in class					
31. I felt qualified to teach DP courses after attending the Institute					
32. As a result of the institute I feel that I could organize a curriculum in DP					
33. The instructors in the institutes devoted part of their class time to teaching techniques					

		SA	A	U	D	SD
34.	The materials that I received from the institute were very valuable to me in teaching DP					

PART III - B

TO BE COMPLETED IF YOU ATTENDED THE SECOND-YEAR PROGRAM AT A SUMMER INSTITUTE.

Please check the appropriate space that best describes your opinion of the statements below using the following code.

SA	Strongly Agree	U	Undecided
A	Agree	D	Disagree
		SD	Strongly Disagree

		SA	A	U	D	SD
1.	The meeting rooms were of adequate size					
2.	The physical factors (color, light, accoustics) were satisfactory					
3.	Ventilation of the rooms was satisfactory					
4.	There was a noticeable lack of the use of visual aids					
5.	The amount of Unit Record Equipment was adequate					
6.	The amount of Computer equipment was adequate					
7.	The number of courses offered was adequate					
8.	The methods of instruction had many shortcomings					
9.	The subject matter was interesting					
10.	I was enthusiastic about learning data processing					
11.	The content of the courses was less than adequate					
12.	The subject matter was too technical					
13.	The number of instructors was adequate					
14.	The number of lab assistants was adequate					
15.	The instructors were highly qualified to teach the subject matter					
16.	The instructors did a satisfactory job of teaching					
17.	The instructors lectured to us as though we were freshmen					
18.	For the most part, the instructors were well prepared for each lesson					
19.	Not enough time was allowed to pursue activities of my own choosing					
20.	There was not enough contact between teacher and participant					
21.	The "hands-on" time in Unit Record labs was inadequate for me					

		SA	A	U	D	SD
22.	The "hands-on" time in Computer labs was inadequate for me					
23.	Scheduling of classes and labs was well organized					
24.	The subject matter was presented too fast					
25.	The lectures were too long					
26.	There were insufficient opportunities to associate with other participants					
27.	I had hopes the institute would be better than it was					
28.	The institute experience has been invaluable to me					
29.	The lack of suitable textbooks was a deterrent in my learning					
30.	There should have been more outside speakers brought in to supplement learning activities in class					
31.	I felt qualified to teach DP courses after attending the Institute					
32.	As a result of the institute I feel that I could organize a curriculum in DP					
33.	The instructors in the institutes devoted part of their class time to teaching techniques					
34.	The materials that I received from the institute were very valuable to me in teaching DP					

PART IV

TO BE COMPLETED ONLY IF YOU ARE NO LONGER ASSOCIATED WITH A SCHOOL SYSTEM

1. If you are now or have been in employed in government, industry, or business, since attending the institute, would you please indicate which and the length of time employed.

TYPE OF EMPLOYMENT	LENGTH OF EMPLOYMENT IN MONTHS
Government	____________
Industry	____________
Business	____________

2. Is your employment now or has it been associated with data processing? ____ Yes ____ No.

3. Can you attribute your decision to leave the classroom to your attendance at an institute? ____ Yes ____ No.

4. Would you please give a brief description of your present job duties.

____

____

____

____

5. To what extent do you feel the institute helped you to prepare for the position you now hold?

_____ Extremely helpful
_____ Helpful
_____ Doubtful
_____ Not helpful at all

Comments:

____
____
____
____

APPENDIX IV

A STUDY OF THE NEEDS FOR DATA PROCESSING TEACHERS

1. Name ____

   Address ____

2. Approximate student enrollment ______________

3. Approximate student enrollment in data processing program(s) ______

4. Number of full-time equivalent instructors ___________

5. Number of full-time equivalent instructors in data processing program ____________

6. Do all of the instructors in data processing have degrees? ___ Yes ___ No.

7. Toward which direction is your data processing program oriented?
   ____ Business ____ Scientific ____ Both Scientific and Business

8. How many years have you had a data processing program? ___________

9. Did you start the present school term with an inadequate number of instructors in the specialized courses? ___ Yes ___ No.

10. How many instructor positions in data processing do you expect to have to fill because of resignations, ill health, retirement, etc. in 1967? _____, in 1968? ______, in 1969? ______

11. How many positions in data processing do you expect to have to fill due to program expansion, increased student enrollment, etc. in 1967? ______, in 1968? ______, in 1969? ______

12. Have you accepted teachers of specialized courses in data processing who had less qualifications than you usually require? ___ Yes ___ No.

13. Would you consider employing an applicant who had 3-5 years of work experience to teach data processing but who did not have a degree? ___ Yes ___ No.

14. Do you require that your data processing teachers have on-the-job work experience in this field as a prerequisite for employment? ___ Yes ___ No.

15. Have any of your present instructional staff members attended a federally supported institute in data processing? ___ Yes ___ No.

    If yes, how many? ______. Please circle which institute.

    Wisconsin Florida Colorado North Carolina California

15a. Listed below are a number of sources from which one might locate a data processing teacher. Would you please use the following code to indicate the helpfulness of these sources to you in your efforts.

continued on next page

15a. continued

0 Have not used this source.
1. This source is not helpful, I've tried it.
2. Source is rarely helpful, have received an occasional lead.
3. Source is questionably helpful, have received some help.
4. Source is helpful most of the time, a good source.
5. Source is extremely helpful, the best source.

______ University or college placement centers
______ Private placement agencies
______ Recruiting efforts at meetings and conventions
______ Department heads and/or staff members of Data Processing departments in colleges or universities
______ State Department of Education/Vocational Education
______ Walk-in applicants
______ Mail inquiries from applicants
______ Recruiting efforts in business, industry, or government
______ Textbook representatives
______ Equipment manufacturer's representatives
______ (Specify) ____

16. Do business data processing teachers in your school earn a higher salary than other teachers who have comparable ability and experience? ____ Yes ____ No.

If yes, what is the average amount more paid to data processing teachers? ________________

17. What is the average salary paid to data processing teachers in your school system? $____________________

18. How does the average teaching load of your full-time data processing teachers compare with other teachers in terms of contact hours?

_____ same _____ higher _____ lower

19. How does the average teaching load of your fill-time data processing teachers compare with other teachers in terms of credit hours?

_____ same _____ higher _____ lower

20. Do any of your data processing teachers assist with or handle completely school administration business (registration, payroll, accounts payable, etc.) as a part of their regularly scheduled work load? ____ Yes ____ No.

If yes, approximately what proportion of those teachers' time is utilized in this manner?

_____ 10% or less _____20% _____30% ______40% _____50% or more

21. Some school systems give data processing teachers financial assistance in order to help them keep abreast of current trends and

technological developments. Is this true of your system? ____ Yes ____ No.

If yes, approximately what percent of his expenses does your school pay for the following:

_____% To attend meetings and conventions of data processing teachers
_____% To attend Equipment Manufacturer's classes
_____% To take Equipment Manufacturer's home-study courses
_____% To attend summer schools offering courses in data processing
_____% Other, please specify ______________________________

22. A number of items are given below to represent reasons teachers might give when leaving a school system. Would you please give the number of data processing teachers who have left your system in the appropriate boxes.

	Remained in Data Processing	
Reason	Yes	No
Took a position in a high school		
Took a position in a Junior/Community College . . .		
Took a position in a Private Business/Technical School		
Took a position in a four-year college/university .		
Went to work for a business firm		
Went to work for himself		
Went into Educational Administration of your school		
Went into Educational Administration of other school		
Other, Please specify ______________________		

23. Listed below are a number of problems you may have faced in initiating your data processing program. Would you please assign a rank order to them according to the seriousness or difficulty. Use a "1" for the most difficult; a "2" for the next most difficult, etc.

_____ Convincing top administration of the need for the program.
_____ Financing the equipment.
_____ Locating qualified instructional staff.
_____ Locating suitable teaching materials.
_____ Determining the curriculum in data processing.
_____ Selling the program to your staff.
_____ Selling the program to students.
_____ Other - Please specify ______________________________
____

24. Listed below are a number of problems you may have faced or are facing in maintaining your data processing program. Would you please rank these items as you did above.

_____ Financing equipment additions.
_____ Financing equipment replacements.
_____ Obtaining equipment repairs.
_____ Locating qualified instructional staff.
_____ Locating suitable teaching materials.
_____ Determining curriculum development.
_____ Selling your program to your staff.
_____ Selling your program to your students.
_____ Scheduling your students on the equipment.
_____ Other - Please specify ____________________________________
____

25. Listed below are a number of problems you may have faced or are facing at present in the organization and administration of student learning activities. Would you please rank these items in terms of their difficulty as you did above.

_____ Interesting students in data processing.
_____ Locating suitable screening instruments for student selection.
_____ Scheduling students on equipment.
_____ Placing students on jobs in industry, business, or government.
_____ Other - Please specify ____________________________________
____

SCHOOLS THAT HAVE A TWO-YEAR REIMBURSED PROGRAM IN DATA PROCESSING

John M. Patterson State Tech
Trade School
Montgomery, Alabama

George C. Wallace State Tech
Trade School
Dothan, Alabama

Fullerton Junior College
Fullerton, California

College of Marin
Kentfield, California

Riverside City College
Riverside, California

San Jose City College
San Jose, California

Ventura College
Ventura, California

Southern Colorado State College
Pueblo, Colorado

Norwalk Community College
Norwalk, Connecticut

Southeast Branch
Chicago City Junior College
Chicago, Illinois

LaSalle-Peru-Oglesby Junior
College
LaSalle, Illinois

Area Voc-Tech School
Hibbing, Minnesota

Kansas State College of
Pittsburgh
Pittsburg, Kansas

Northern Kentucky State Area Voc-Tech School
Covington, Kentucky

Montgomery Junior College
Takoma Park, Maryland

Central Missouri State College
Warrensburg, Missouri

Nebraska Voc-Tech School
Milford, Nebraska

Clark County School District
Las Vegas, Nevada

Union County Technical Institute
Mountainside, New Jersey

Albuquerque Tech-Voc Institute
Albuquerque, New Mexico

Borough of Manhattan Community
College
City University of New York
New York, New York

Lorain Community College
Lorain, Ohio

Springfield and Clark County
Technical Education Program
Springfield, Ohio

Duncan Area Vocational School
Duncan, Oklahoma

Oklahoma State Tech
Okmulgee, Oklahoma

Chattanooga State Technical
Institution
Chattanooga, Tennessee

Weber State College
Ogden, Utah

Vocational, Technical and
Adult School
Green Bay, Wisconsin

Odessa College
Odessa, Texas

San Antonio College
San Antonio, Texas

APPENDIX V

A STUDY OF POTENTIAL DATA PROCESSING PROGRAMS

1. Name of School ______________________________

School Address ______________________________

Approximate Student Enrollment ______________________________

Approximate Number of Instructors ______________________________

Do you have a computer in your school system? ____ Yes ____ No.

Do you presently offer a preparatory course of study in data processing for the training of computer programmers and business application analysts? ____ Yes ____ No.

> IF YOUR RESPONSE TO THE ABOVE QUESTION WAS "YES" - WOULD YOU PLEASE COMPLETE PART A ONLY; IF NO, WOULD YOU PLEASE COMPLETE PART B ONLY.

PART A

1. Approximate student enrollment in data processing program? ________
2. Number of full-time equivalent instructors in data processing? _____
3. Do all data processing instructors have degrees? ____ Yes ____ No.
4. Toward which direction is your data processing program oriented?
   ____ Business ____ Scientific ____ Both Scientific and Business.
5. Did you start the present school term with an inadequate number of instructors in the specialized courses? ____ Yes ____ No.
6. Have you accepted teachers of the specialized courses in data processing who had less qualifications than you usually require?
   ____ Yes ____ No.
7. Do data processing teachers in your school earn a higher salary than other teachers who have comparable ability and experience?
   ____ Yes ____ No.
8. What is the average salary paid to data processing teachers in your school system? $____________________
9. Would you please list what you consider your best sources of locating data processing teachers? (College placement centers, walk-in applicants, textbook representatives, etc.)
   ____
   ____
   ____

10. Approximately how many of your data processing teachers have related work experience? ______________________________

____

PART B

11. Would you please estimate the number of computer installations which would fall within a thirty-mile radius of your school? ____________

12. Is there an educational institution within a thirty-mile radius of your school which offers a two-year processing preparatory course of study? ____ Yes ____ No.

13. To what extent are you considering the offering of a preparatory course of study for the training of computer programmers or application analysts?

_____ We are strongly considering it by studying such problems as financing, enrollments, staffing, courses, etc.

_____ We are considering it; keeping eye on developments

_____ We are talking about it, but not seriously considering it

_____ We are not presently considering it

_____ We have considered and have decided against it

_____ Other, specify ______________________________

14. If you have strongly considered or are presently strongly considering the offering of such a program, would you please rank the problems listed below according to their seriousness or difficulty. Use a "1" for the most serious, a "2" for the next most serious, etc.

_____ Justifying the program on the basis of need of students

_____ Financing the equipment

_____ Locating and hiring qualified staff to teach the courses

_____ Determining the curriculum in data processing

_____ Locating suitable materials (teaching and learning)

_____ Selling the program to your staff

15. Do you have a two-year preparatory course of study in data processing approved to be offered within the next 18 months? ____ Yes ____ No.

If yes, when do you plan to make your courses available for student enrollment? Give month and year ______________________________

POST SECONDARY SCHOOLS NOT HAVING A 2-YEAR DATA PROCESSING PROGRAM WHICH IS REIMBURSED

Northwest Alabama Junior College
Phil Campbell, Alabama

Los Angeles Pierce College
Woodland Hills, California

Santa Monica City College
Santa Monica, California

Post Junior College
Waterbury, Connecticut

Gulf Coast Junior College
Panama City, Florida

Freeport Community College
Freeport, Illinois

Clinton Community College
Clinton, Iowa

Eagle Grove Junior College
Eagle Grove, Iowa

Webster City Junior College
Webster City, Iowa

Neosho County Community Junior College
Chanute, Kansas

Anne Arundel Community College
Severna Park, Maryland

Leicester Junior College
Leicester, Massachusetts

Mount Ida Junior College
Newton Centre, Massachusetts

Mount Wachusett Community College
Gardner, Massachusetts

Quincy Junior College
Quincy, Massachusetts

Hudson Valley Community College
Troy, New York

Jamestown Community College
Jamestown, New York

Jefferson College
Hillsboro, Missouri

Meramec Community College
Kirkwood, Missouri

Packer Collegiate Institute
Brooklyn, New York

Gardner-Webb Junior College, Inc.
Boiling Springs, North Carolina

Mount Olive Junior College
Mount Olive, North Carolina

El Reno Junior College
El Reno, Oklahoma

Poteau Community College
Poteau, Oklahoma

Sayre Junior College
Sayre, Oklahoma

Panola County Junior College
Carthage, Texas

Ranger Junior College
Ranger, Texas

Green Mountain College
Poultney, Vermont

Stratford College
Danville, Virginia

Shoreline Community College
Seattle, Washington

APPENDIX VI

STUDY OF DATA PROCESSING IN PRIVATE SCHOOLS

Name of School ______________________________

School Address ______________________________

Approximate student enrollment ______________________________

Do you have a computer in your school system? ____ Yes ____ No.

Do you presently offer a preparatory course of study in data processing for the training of computer programmers or application analysts?
____ Yes ____ No.

If YES, would you please respond to Part A only -
If NO, would you please respond to Part B only

PART A

1. Approximate student enrollment in computer programming and application analysts courses? ________________
2. Number of full-time equivalent instructors in these courses? _______
3. Toward which direction is your program oriented?
   _____ Business _____ Scientific _____ Both Business and Scientific
4. Do your programming instructors have experience in industry, government, or business as programmers? ____ Yes ____ No.
5. Do your instructors of these specialized courses receive a higher salary than other teachers on your staff with comparable ability and experience? ____ Yes ____ No.
6. Listed below are several sources where teachers might receive training to teach data processing courses. Would you please rank these sources in terms of their usefulness to your staff. Use a "1" for the most beneficial, a "2" for the next most beneficial, etc.

   _____ Equipment Manufacturer's Classes
   _____ Equipment Manufacturer's Home-study or personal study courses
   _____ Public Colleges or Universities
   _____ In-service training programs in business, industry, or government
   _____ Private Business/Technical Schools
   _____ Other, Specify ______________________________

7. Have you experienced difficulty in locating instructors for the specialized courses in data processing? ____ Yes ____ No.
8. Have you experienced difficulty in employing instructors for specialized courses in data processing? ____ Yes ____ No.

9. Listed below are a number of sources from which one might locate a data processing teacher. Would you please use the following code to indicate the helpfulness of these sources to you in your efforts.

0. Have not used this source
1. This source is not helpful, I've tried it
2. Source is rarely helpful, have received an occasional lead
3. Source is questionably helpful, have received some help
4. Source is helpful most of the time, a good source
5. Source is extremely helpful, the best source

_____ University or college placement centers
_____ Private placement agencies
_____ Recruiting efforts at meetings and conventions
_____ Department heads and/or staff members of Data Processing departments in colleges or universities
_____ State Department of Education/Vocational Education
_____ Walk-in applicants
_____ Mail inquiries from applicants
_____ Recruiting efforts in business, industry, or government
_____ Textbook representatives
_____ Equipment manufacturer's representatives
_____ (Specify) other: ____

PART B

10. To what extent are you considering the offering of a preparatory course of study for the training of computer programmers or application analysts?

_____ We are strongly considering it by studying such problems as financing equipment, enrollment, staffing, courses, etc.
_____ We are considering it; keeping eye on developments
_____ We are talking about it, but not seriously considering it
_____ We are not considering it
_____ Other, Specify: ____

10a. If you are strongly considering the offering of such a program, would you please rank the problems listed below according to their seriousness or difficulty. Use a "1" for the most serious, a "2" for the next most serious, etc.

_____ Financing the equipment
_____ Locating and employing qualified staff
_____ Determining curriculum
_____ Locating suitable teaching and learning materials
_____ Other, Specify: ____

PROPRIETARY BUSINESS COLLEGES

Bryant & Stratton College of Commerce
2115 The Alameda
San Jose, California

Southeastern University College of Business & Financial Administration
1736 G Street, N.W.
Washington, D. C.

Marsh-Draughon Business College
322 Ivey Street, N.E.
Atlanta, Georgia

Midstate College of Commerce
240 SW Jefferson Avenue
Peoria, Illinois

Nettleton Business Training College
NBT Bldg., 509 Nebraska Street
Sioux City, Iowa

Stevens Business College, Inc.
881 South Street
Fitchburg, Maryland

Davenport College of Business
12 South Division Avenue
Grand Rapids, Michigan

Hesser Business College
155 Concord Street
Manchester, New Hampshire

Bryant & Stratton Business Institute, Inc.
1028 Main Street
Buffalo, New York

Dyke College
1375 East Sixth Street
Cleveland, Ohio

Blackwood Business College
1015 North Walker Avenue
Oklahoma City, Oklahoma

Sawyer School of Business
747 South Hill Street
Los Angeles, California

Business University of Tampa
315 Jackson Street
Tampa, Florida

Gem City College
700 State Street
Quincy, Illinois

International College
120-122-124 W. Jefferson Street
Fort Wayne, Indiana

Wichita Business College, Inc.
209 North Broadway
Wichita, Kansas

Northeastern School of Commerce
701-705 North Madison Avenue
Bay City, Michigan

Billings Business College
3125 Third Avenue, North
Billings, Montana

New Hampshire College of Accounting and Commerce
88 Hanover Street
Manchester, New Hampshire

Hammel-Actual Business College
55-59 East Market Street
Akron, Ohio

Miami-Jacobs Junior College of Business
38 North Ludlow Street
Dayton, Ohio

Cambria-Rowe Business College
221 Central Avenue
Johnstown, Pennsylvania

Lackawanna Junior College
Linden Street at Jefferson Ave.
Scranton, Pennsylvania

Aberdeen School of Commerce
314½ South Lincoln Street
Aberdeen, South Dakota

Henderson Business College, Inc.
530 Linden Avenue
Memphis, Tennessee

Smithdeal-Massey Business
College, Inc.
300 West Grace Street
Richmond, Virginia

Palmer College
125 Bull Street
Charleston, South Carolina

National College of Business
321 Kansas City Street
Rapid City, South Dakota

Southwestern Business University
1006 Caroline Street
Houston, Texas

Madison Business College
215 West Washington Avenue
Madison, Wisconsin

APPENDIX VII

A STUDY OF DATA PROCESSING TEACHER PREPARATION IN TEACHER TRAINING INSTITUTIONS

1. Name of Institution: ______________________________

2. City and State: ______________________________

3. Approximate student body enrollment? ____________________

4. Approximate number of Business Education Majors (those who are preparing to teach business education subjects at either high school or post secondary school level) who graduate yearly? ____________

5. Is there a computer on your campus? ______ Yes ______ No

   If yes, would you please indicate below the extent to which it is available for student usage.

   ______ Open-door policy; students may use it if enrolled in a course requiring it. Hands-on time is provided.

   ______ Open-door policy; only students who are engaged in research type problems may use the computer.

   ______ Closed-door policy; but students may have their programs run.

   ______ Closed-door policy; not available for any student usage for any purpose.

6. If data processing courses were offered prior to the 1963-64 academic year, would you please complete the form below by listing the title of data processing courses in Column I; whether or not the course was required for business education majors in Column II; and, in Column III the department which was responsible for course content, student advising, and staffing. If no courses were offered, please write none.

COURSES OFFERED PRIOR TO 1963-64					
	Required?		Department Responsibility?		
Course Title	Yes	No	Content	Advising	Staffing
1.					
2.					
3.					
4.					
5.					
6.					

7. If data processing courses are currently being offered on your campus, would you please complete the form below by listing the title of data processing courses in Column I; whether or not the course

is required for business education majors in Column II; and, in Column III, the department which is responsible for the content of the course, student advising, and staffing. If no courses are offered, would you please write "none."

DATA PROCESSING COURSES OFFERED AT PRESENT					
Course Title	Required?		Department Responsibility?		
	Yes	No	Content	Advising	Staffing
1. ______					
2. ______					
3. ______					
4. ______					
5. ______					
6. ______					
7. ______					

Please respond to the questions which follow. When responding to questions 8-13, would you think of members of your staff, whether or not they have responsibility for teaching data processing courses.

8. Do those who teach the specialized courses in data processing have work experience in industry, government, or business as a data processor? ______ Yes ______ No.

9. Did any of those who teach the specialized courses in data processing attend one of the five federally sponsored summer institutes in data processing for business teachers? ______ Yes ______ No.

10. Have any members of your staff taken courses in data processing from a college or university within the past three years? ______ Yes ______ No.

11. Have any members of your staff taken courses offered by a computer equipment manufacturer within the past three years? ______ Yes ______ No.

12. Are any of your staff members actively participating in or members of data processing organizations such as Data Processing Management Association, Society of Automation in Business Education, etc? ______ Yes ______ No.

13. Does your Business Education Department plan to offer specialized courses in data processing in the future which are not being offered at present? ______ Yes ______ No.

    If yes, and you have these sufficiently defined, would you please list the titles.

    ____

    ____

14. Would you please estimate the number of inquiries you may have received in which the inquirer was attempting to locate data processing teachers for employment purposes during 1965 ____ and 1966 ____.

15. Would you please estimate the number of inquiries you may have received from teachers who were investigating the availability of data processing courses in which they might enroll for 1965? _____ 1966? _____

16. What qualifications do you feel that high school data processing teachers should possess? You may wish to include in your discussion such ramifications as the certification requirements these teachers should be expected to meet. Feel free also to comment upon your reaction to whether or not data processing courses should be offered at the high school level.

____

____

____

____

____

If any data processing courses are offered in your department or have close contact with the department offering and staffing data processing courses in which your students enroll, would you please complete the remainder of the questionnaire.

17. Is your department experiencing difficulty in locating qualified staff members to teach specialized courses in data processing? ______ Yes ______ No.

18. Is your department experiencing difficulty in hiring qualified staff members to teach specialized courses in data processing? ______ Yes ______ No.

19. Do teachers of specialized courses in data processing in your department receive a higher salary than others who have comparable ability and experience? ______ Yes ______ No.

20. Do your data processing teachers carry a greater teaching load than other teachers in your department? ______ Yes ______ No

21. Have you accepted teachers of specialized courses in data processing who had less qualifications than you usually require? ______ Yes ______ No.

22. How many teaching positions for specialized data processing courses in data processing do you expect to have to fill in 1967? _____ 1968? _____ 1969? _____

23. Do your staff members in data processing experience difficulty in keeping abreast of technological changes being made in data processing equipment? ______ Yes ______ No.

24. Some schools reimburse teachers to some extent for expenses incurred in keeping abreast of changes and developments. Is this true of your institution for your data processing teachers? ______ Yes ______ No.

25. Do your staff members in data processing have difficulty in locating suitable textbooks and supplemental materials for student usage? ______ Yes ______ No.

26. Have any data processing teachers terminated their employment from your department within the past two years? ______ Yes ______ No.

If yes, how many? ______ Approximately what per cent of those leaving went to work in industry, government, or business? ______%

27. Would you please list what you consider your best sources of locating data processing teachers? (College placement centers, recruiting efforts in conventions or in business firms, walk-in applicants, textbook representatives, etc.). Please list the best sources first.

____

____

____

____

28. Additional comments?

SENIOR INSTITUTIONS OFFERING BUSINESS EDUCATION

Florence State College
Florence, Alabama

Oakwood College
Huntsville, Alabama

Troy State College
Troy, Alabama

Chico State College
Chico, California

California State College at
  Los Angeles
Los Angeles, California

University of Colorado
Boulder, Colorado

Southern Colorado State College
Pueblo, Colorado

University of Bridgeport
Bridgeport, Connecticut

Bethune-Cookman College
Daytona Beach, Florida

Clark College
Atlanta, Georgia

University of Kentucky
Lexington, Kentucky

Washington State Teachers College
Machias, Maine

Maryland State College
Princess Anne, Maryland

Marygrove College
Detroit, Michigan

Western Michigan University
Kalamazoo, Michigan

St. Cloud State College
St. Cloud, Minnesota

Union College
Lincoln, Nebraska

University of Nevada
Reno, Nevada

D'Youville College
Buffalo, New York

St. Augustine's College
Raleigh, North Carolina

Ohio University
Athens, Ohio

Southern Oregon College
Ashland, Oregon

Marywood College
Scranton, Pennsylvania

Erskine College
Due West, South Carolina

University of South Dakota
Vermillion, South Dakota

Texas Technological College
Lubbock, Texas

Central Washington State College
Ellensburg, Washington

The University of Wisconsin
Madison, Wisconsin

University of Miami
Coral Gables, Florida

University of Southern Mississippi
Hattiesburg, Mississippi

APPENDIX VIII

A STUDY OF THE IMPACT OF SUMMER DATA PROCESSING INSTITUTES

1. If any computer programmer preparatory programs will begin in your state for the first time during 1967, would you please indicate the number of such programs in the appropriate spaces below. If none, please write "none".

Number of Beginning Programs	Types of institutions in which training will be offered
____	High Schools
____	2-Year Post Secondary Public Schools
____	Specify ____

2. Do you anticipate approving and initiating computer programmer preparatory programs in your state in 1968? Yes ____ No ____ in 1969? Yes ____ No ____

If yes, for either year, would you please indicate the number of such programs in appropriate spaces below.

Number of Programs		Types of Institutions
1968	1969	
____	____	High Schools
____	____	2-Year Post Secondary Public Schools
____	____	Specify ____

3. Is there a shortage of data processing teachers in your state? Yes ____ No ____

   a. If yes, what is the approximate number needed in each category below?

   ____ Business Data Processing
   ____ Scientific Data Processing
   ____ Combination of above

   b. If yes to question number 3 above, what is the approximate number needed in each category below?

   ____ High School
   ____ 2-Year Post Secondary Public Schools
   ____ Specify ____

4. Would you please estimate the number of inquiries you may have received, in which the inquirer was attempting to locate data processing teachers for employment purposes for 1964 ____, 1965 ____, 1966 ____.

5. If you have received inquiries for data processing teachers for employment purposes, would you please indicate the number of such inquiries received according to the sources of origin listed below.

Number Inquiries Received		Sources of Inquiries
1965	1966	
		High Schools
		2-Year Post Secondary Public Schools
		Proprietary Schools
		Colleges/Universities
		Specify

6. Have any studies been conducted in your state which were concerned with the problem of supply and demand for business data processing teachers? Yes ____ No ____ Don't know ____

7. Have any studies been conducted in your state which were concerned with the types of data processing programs which should be offered at the high school level? Yes ____ No ____ Don't know ____

8. Approximately how many computer programmers are needed in your state by business, industry, and government at present? __________ Don't know ____

9. What is the number of Manpower Development Training Act or similar projects in progress in your state at present in which computer programmers are being trained? ___________

10. Would you please comment on the adequacy of data processing programs offered in your state. What are some of the more important problems experienced in these programs?

As you are probably aware, summer institutes in data processing for business teachers were federally sponsored during 1963, 1964, and 1965. In the summer of 1963 a first-year program for these teachers was offered. The remaining questions relate to the above institutes and data processing teacher education.

11. Is there a need to continue the federally sponsored summer institutes in data processing for business teachers? Yes ____ No ____

12. Is there a need for a third-year program in the institutes? Yes ____ No ____

If yes, what length would you suggest and what topics do you feel should be included in the third-year program? _______ weeks

Topics to be included:

13. If the institutes were continued, should the participants receive some training allowances? Yes ____ No ____

    If yes, what percent of the following items should a participant receive?

    ________ % Travel to and from training facility
    ________ % Books and Supplies
    ________ % Tuition
    ________ % Cost of Living

14. If data processing instructional personnel in high schools of your state are certified, would you briefly describe the requirements which they must meet.

15. Would you please comment on the adequacy of data processing teacher education in your state. Are enough teachers being prepared by the colleges and universities? What about the quality of their preparation to teach specialized courses such as Computer Programming, Information Retrieval, etc.?

APPENDIX IX

COMMENTS FROM STATE DIRECTORS REGARDING ADEQUACY OF DATA PROCESSING TEACHER EDUCATION

Question No. 15: Would you please comment on the adequacy of data processing teacher education in your state. Are enough teachers being prepared by colleges and universities? What about the quality of their preparation to teach specialized courses such as computer programming, information retreival, etc?

1. We have none, sorry to say. Educators are 10 years behind in training teachers. The university does have the equipment but not for training teachers per se.

2. Very adequate, yes. Excellent.

3. There are persons being prepared. The problem is that we require 3 years of occupational experience. It is hard to get them into teaching after working in industry.

4. Teachers are not being prepared for computer programming at this time.

5. There are not enough teachers and the quality of their preparation is inadequate.

6. Very few actual training for and as a teacher of DP. No one has assumed any leadership in preparing teachers.

7. The State Department of Education, in cooperation with the University is establishing training programs for teachers. These programs are conducted in various parts of the state. Our current thinking is that this program should be a three-semester offering. These programs are presently oriented to tab equipment.

8. No training for DP teachers in our state. We must look to the USOE and other facilities for teacher training.

9. Students who graduate in DP from a senior institution will not teach in our junior colleges for the low salaries available. As a result, we have to train our own teachers. This situation has not been entirely satisfactory.

10. Not adequate. No. Only 2-year programs for technical nature. Not sufficient for computer work.

11. I have been told by experts in the field that the picture is one of total inadequacy. There is a need to define the role of the high school in such a continum of programs and too few institutions providing teacher training.

12. The program in our state is adequate. Supply has not caught up with demand as yet but is rapidly closing the gap.

13. Inadequate.

14. a) Only one college program offers computer programming at present--two others will in the near future.
    b) We are not geared up yet to the 12 semester hour requirement.
    c) Quality of courses, excellent-quantity of students improving.

15. Additional EDP courses should be included as part of the undergraduate program for teachers. Some of the private and state colleges do not provide courses in DP.

APPENDIX X

COMMENTS FROM STATE DIRECTORS REGARDING ADEQUACY OF DATA PROCESSING PROGRAMS

Question No. 10. Would you please comment on the adequcy of data processing programs offered in your state. What are some of the more important problems experienced in these programs?

1. The two year curriculum appears to be adequate for training students for entry level employment. Major problems are 1. Qualified available instructors. 2. Training for up-grading instructors.

2. It is very difficult to get educators and administrators to look ahead ten years and start a training program, instead educators are 10 years late.

3. The problem of keeping up-to-date with equipment is becoming prohibitive as to cost.

4. We are at present just entering the DP field and are experiencing a lack of vocationally qualified instructors and having difficulty determining the time required for training competent prospective employees in the DP field.

5. Very adequate.

6. We are in hopes that within the next several years every business education student will have some data processing in his high school program. We currently have a committee working to develop the kind and amount of training each business student will receive. By September 1967, seven of twenty-four school systems will have DP training centers available to secondary students. All of these are tab installations.

7. ________has 27 designated area vocational schools on the post high level, 24 of these are operating. Just about all of the DP programs in the public schools is being conducted in this type of school. Cost of operation is the greatest factor. Teacher acquisition is also a problem. Job placement is not a problem.

8. It is apparent that we do not have an adequate number of DP programs at the secondary or post-secondary levels. We do not have an adequate number of trained instructors at either level. We plan to develop state-wide workshops for secondary and post-secondary teachers during the current fiscal year. These workshops will provide training relative to unit record keeping equipment and input media.

9. At present 7 DP programs are in operation in the post-secondary schools. Approximately 4 more installations will be provided during the next two years. This state has a critical shortage of qualified data processing teachers at present.

10. A. Producing too small a number of students.
    B. Poorly prepared potential instructors.

11. Limited because updated equipment is not presently installed. One important problem is maintaining an up-to-date CPU for training purposes.

12. A. Selling the idea of DP and electronic computers to school officials and teachers.
    B. Use of electronic computers for educational use, administrative use. They must be separated.

13. We are in the process of developing our program and are having growing pains. We are experiencing great difficulty in a) well qualified teachers, b) getting delivery of hardware, c) getting curriculum established, d) getting right students, in that order.

14. Our 15 district state system of post-high school vocational, technical and adult school system (63 schools) has an 8 school network of two-year associate degree programs in BDP plus several one-year vocational data processing programs. Problems: (a) updating of present staff through summer work experience programs, (b) problems associated with development of interdisciplinary programs in data processing (numerical control, health occupations, BE, etc.).

15. Need more advanced programming courses.
    Problems: Teacher shortage for advanced courses, equipment cost.

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